US009237394B2

(12) **United States Patent**
Seo et al.

(10) **Patent No.: US 9,237,394 B2**
(45) **Date of Patent: Jan. 12, 2016**

(54) **CANAL TYPE EARPHONE WITH PRESSURE EQUILIBRIUM MEANS**

(71) Applicant: **BUJEON CO., LTD.**, Ansan-si, Gyeonggi-do (KR)

(72) Inventors: **Dong Hyun Seo**, Ansan-si (KR); **Seung Cheol Lee**, Seoul (KR); **Su Cheon Lee**, Ansan-si (KR)

(73) Assignee: **BUJEON CO., LTD.**, Ansan-si, Gyeonggi-do (KR)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/287,565**

(22) Filed: **May 27, 2014**

(65) **Prior Publication Data**

US 2014/0348372 A1 Nov. 27, 2014

(30) **Foreign Application Priority Data**

May 24, 2013 (KR) 10-2013-0059288
May 23, 2014 (KR) 10-2014-0062509

(51) **Int. Cl.**
H04R 25/00 (2006.01)
H04R 1/10 (2006.01)

(52) **U.S. Cl.**
CPC ***H04R 1/1016*** (2013.01); *H04R 2460/11* (2013.01)

(58) **Field of Classification Search**
CPC H04R 1/1016; H04R 2060/09; H04R 2460/114; H04R 2460/11
See application file for complete search history.

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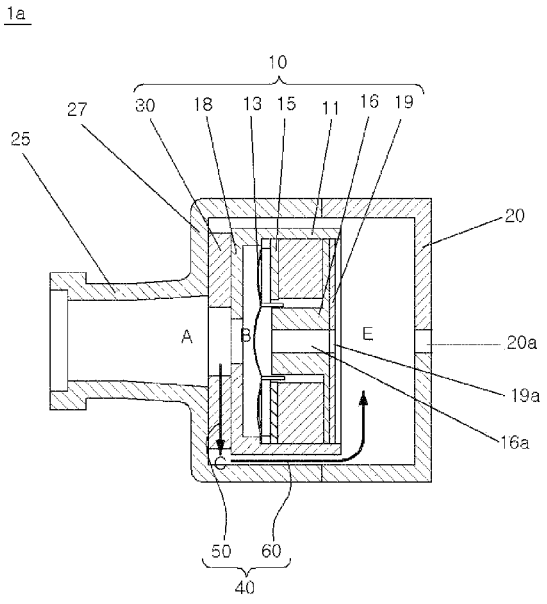
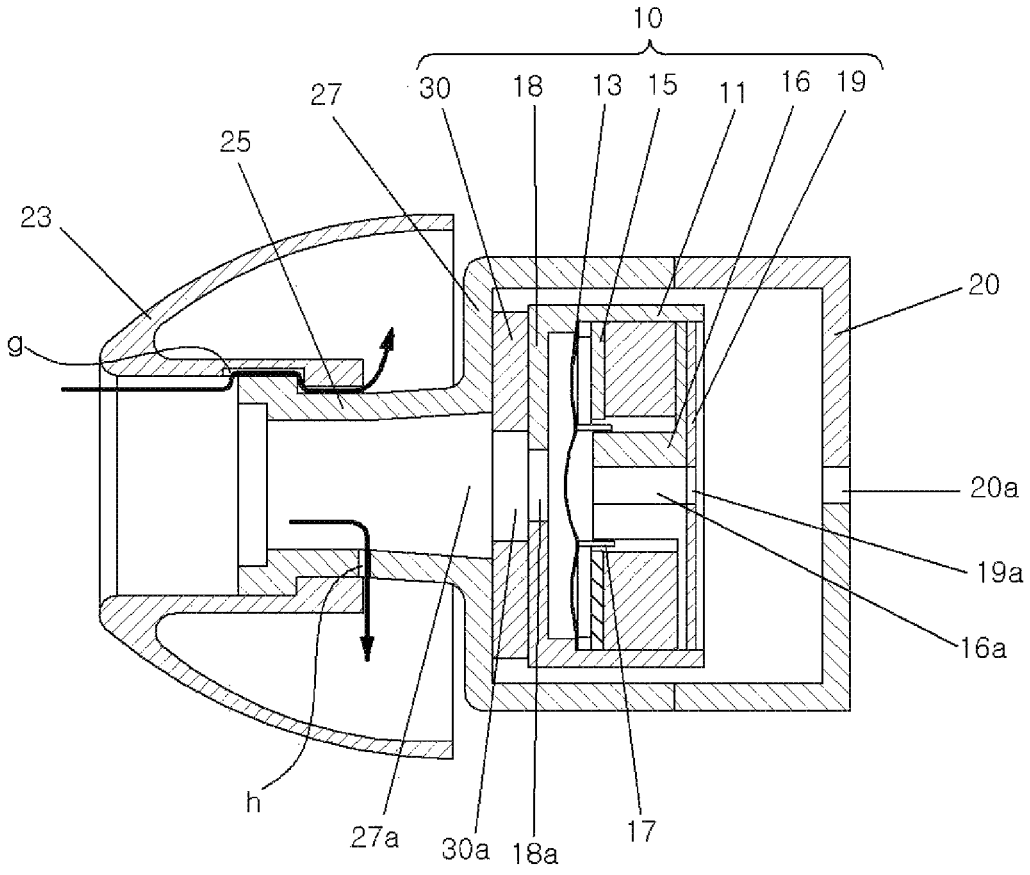
Primary Examiner — Curtis Kuntz
Assistant Examiner — Ryan Robinson
(74) *Attorney, Agent, or Firm* — Novick, Kim & Lee, PLLC; Jae Youn Kim

(57) **ABSTRACT**

Disclosed herein is a canal type earphone with a pressure equilibrium means, capable of eliminating a pressure difference between a user's external auditory meatus and an outside during wearing of the canal type earphone. A pressure equilibrium means includes a side air passage through which air within a tube or air within a speaker unit in the canal type earphone is discharged to a side surface of a gasket or a side surface of the speaker unit, and a rear air passage through which air in the side surface of the speaker unit is discharged to the rear of the speaker unit.

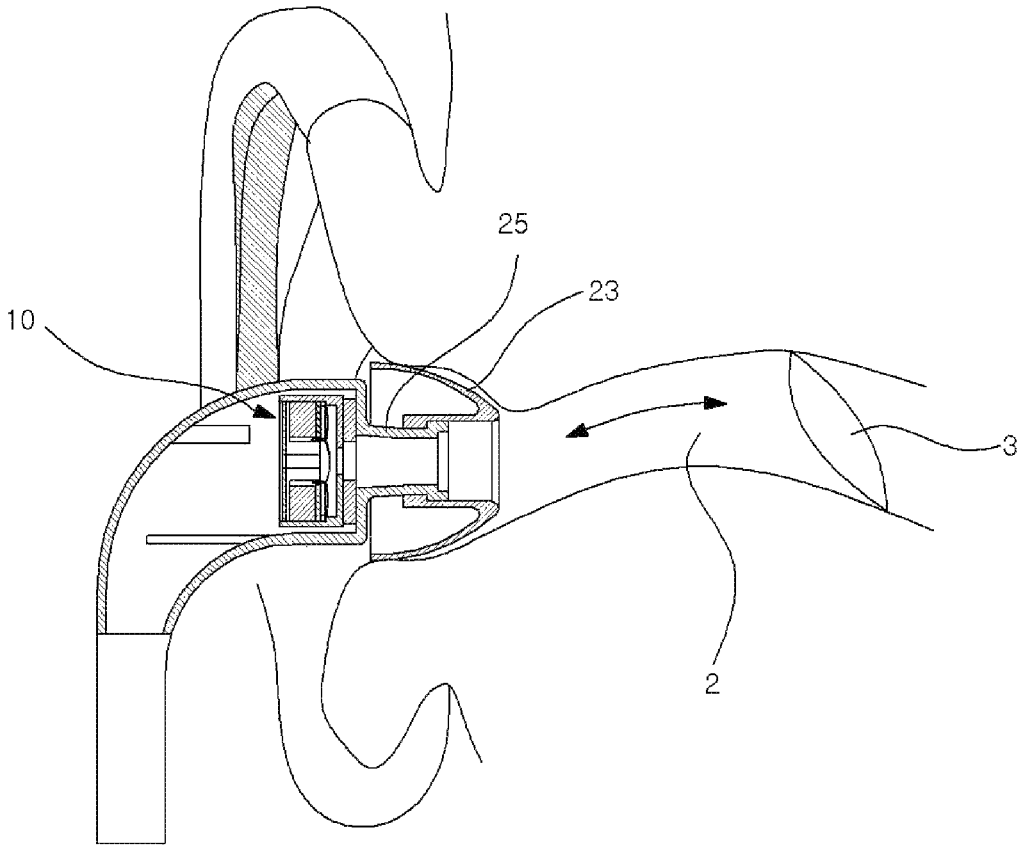
11 Claims, 25 Drawing Sheets





PRIOR ART

FIG. 1



PRIOR ART

FIG. 2

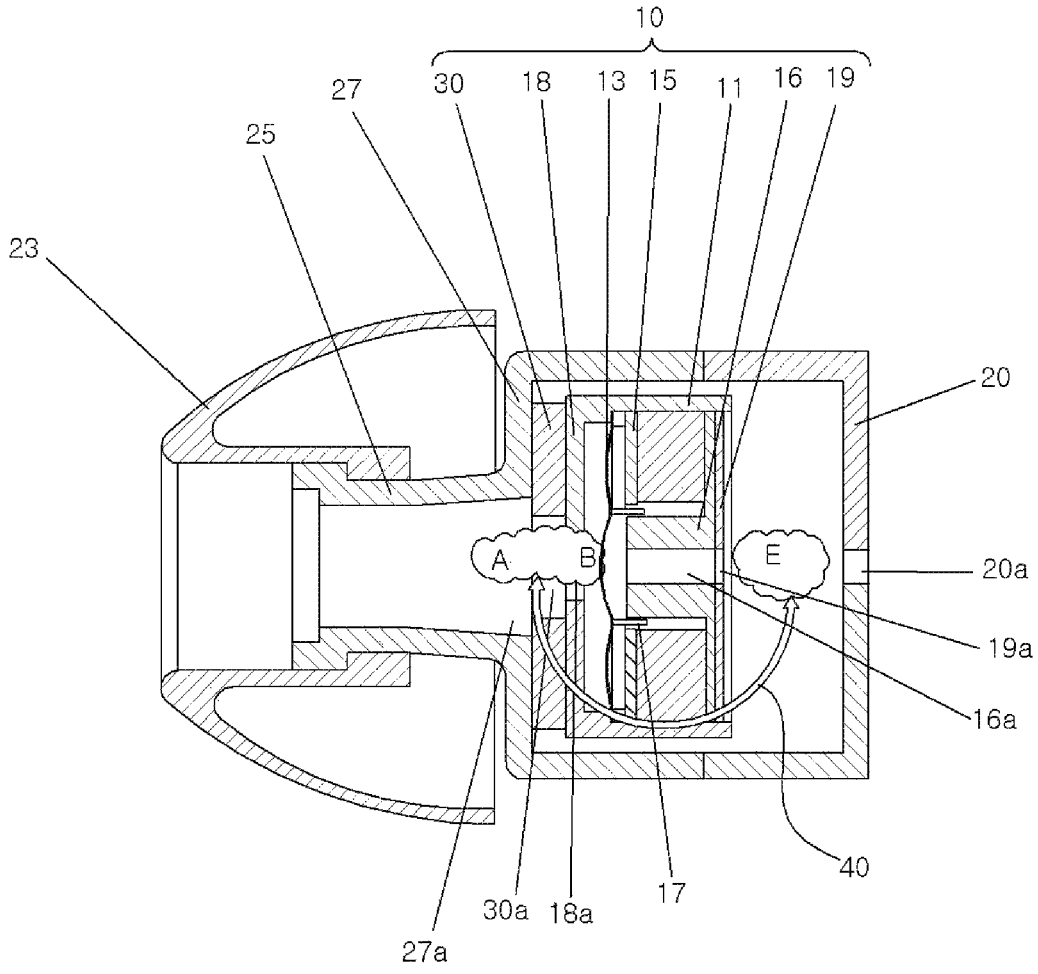


FIG.3

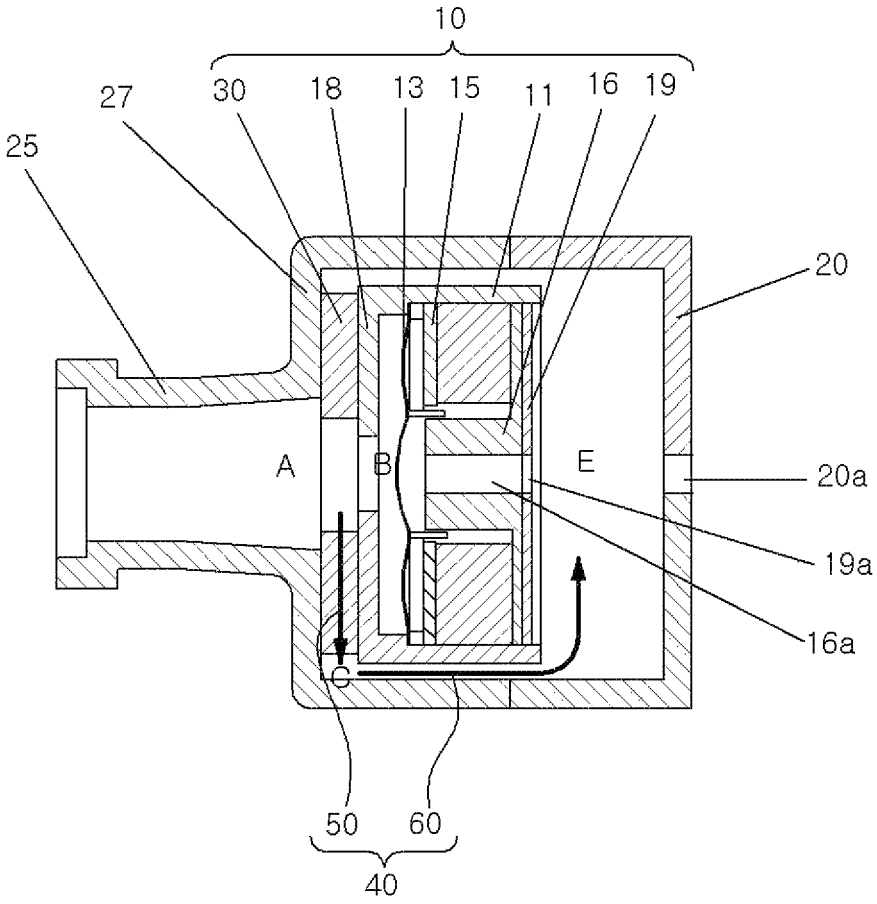


FIG. 4

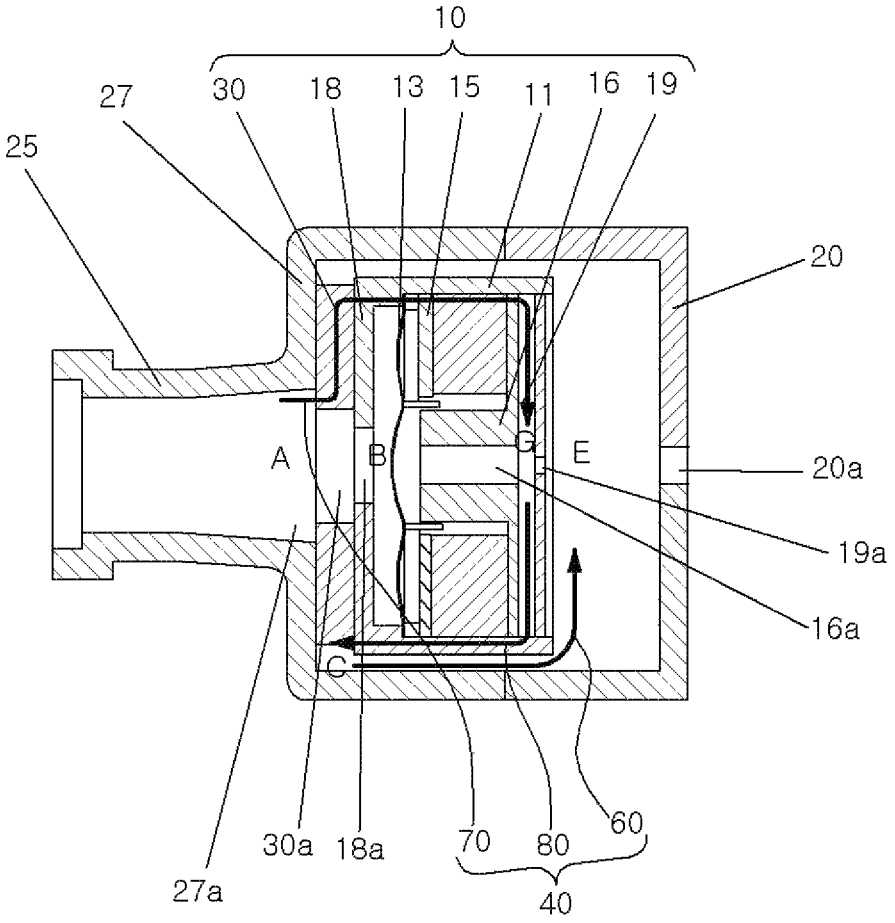

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FIG. 5

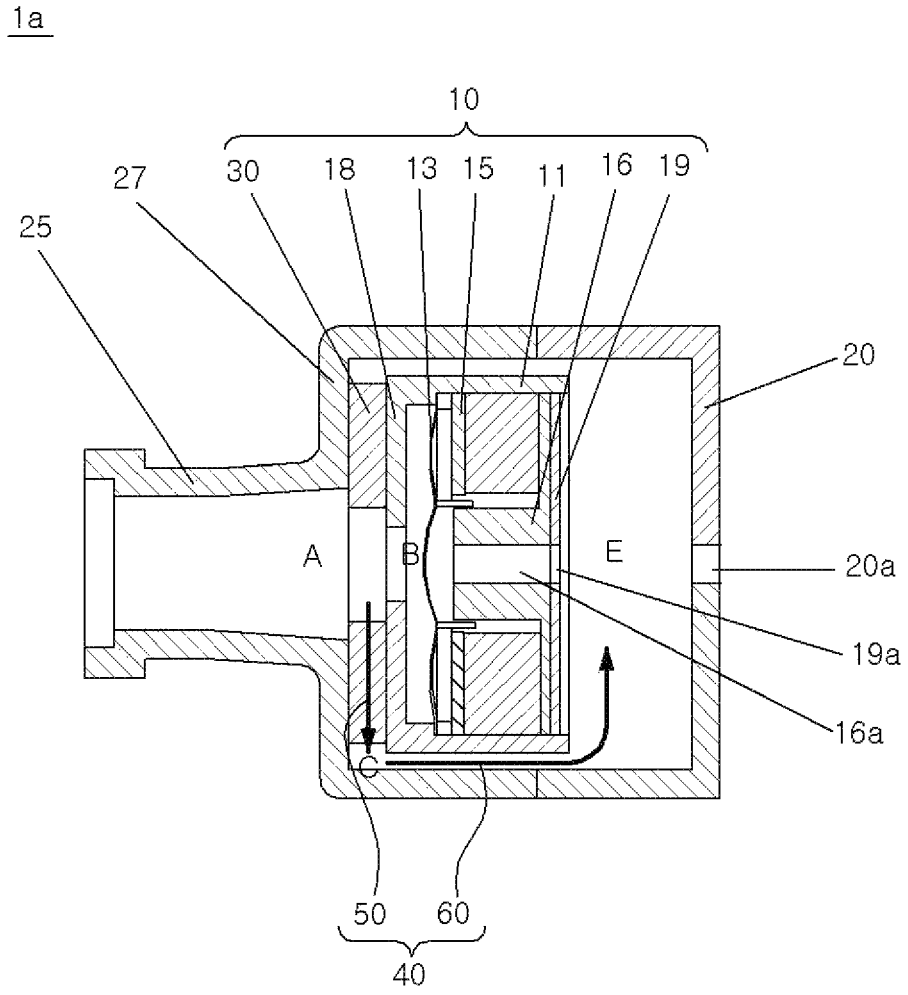


FIG. 6

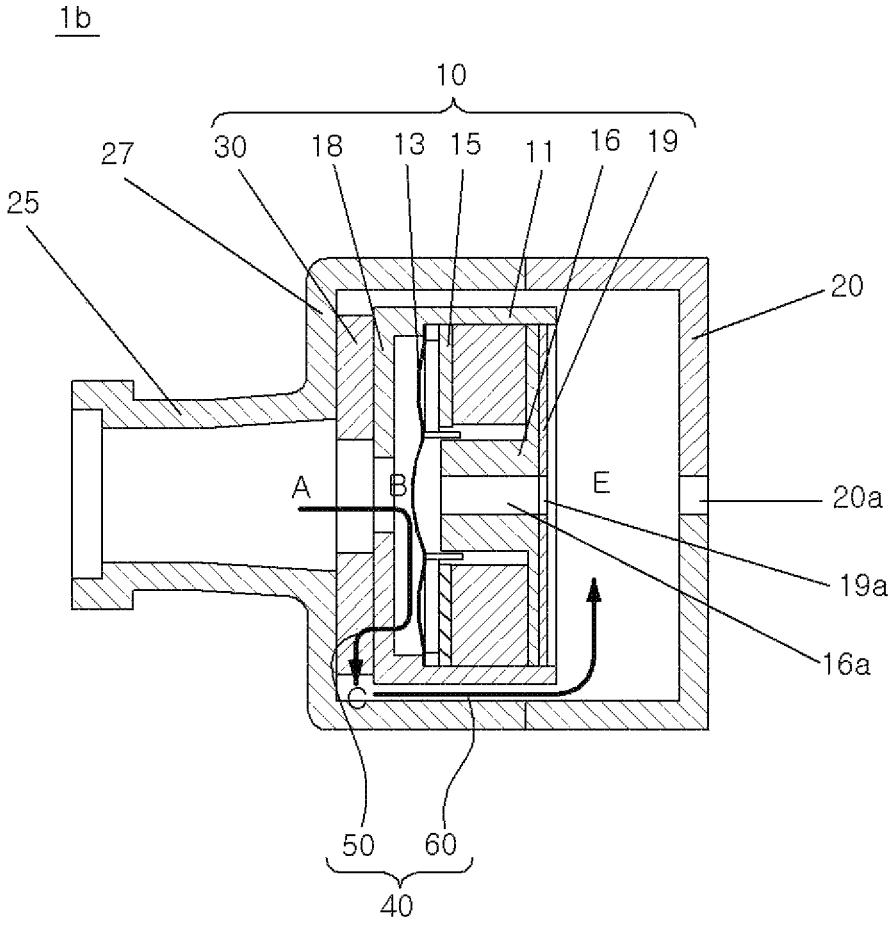


FIG. 7

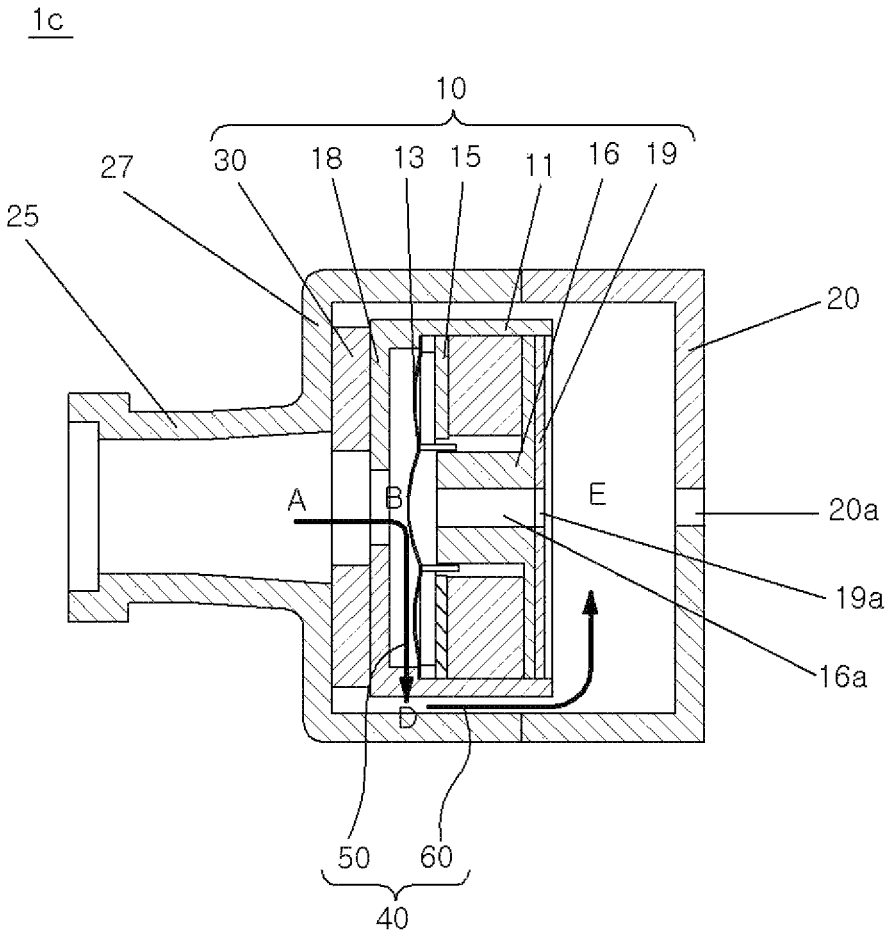
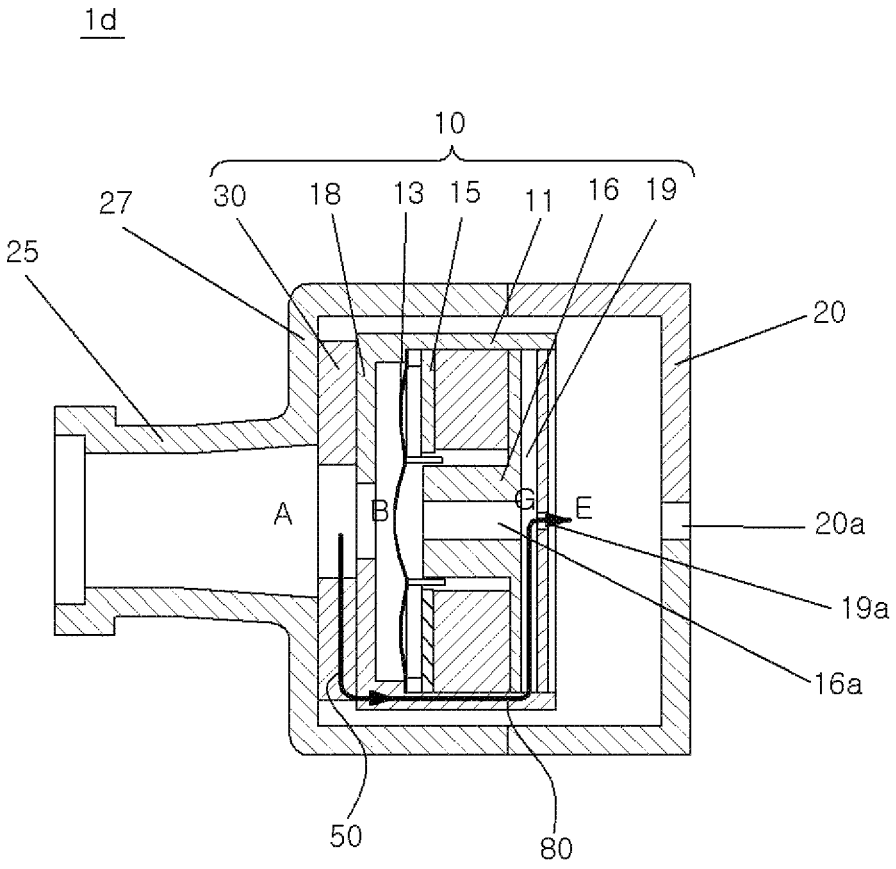


FIG. 8



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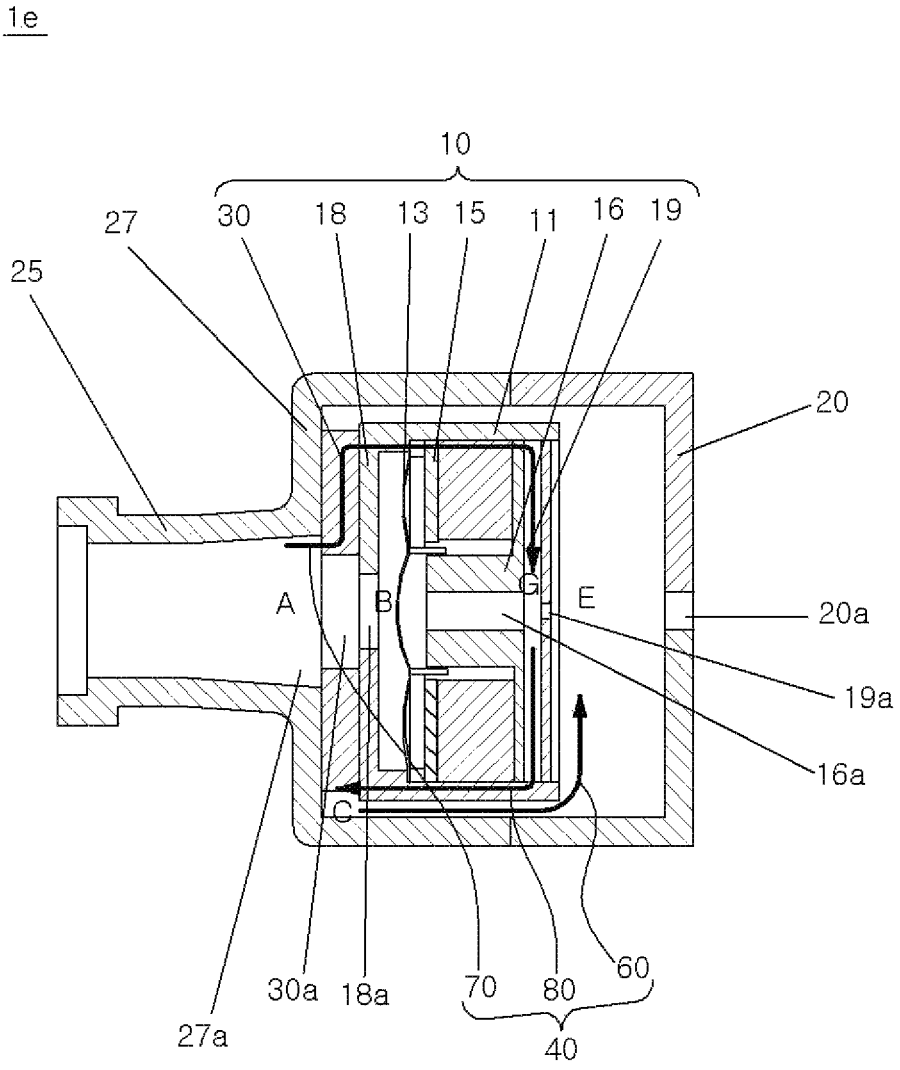
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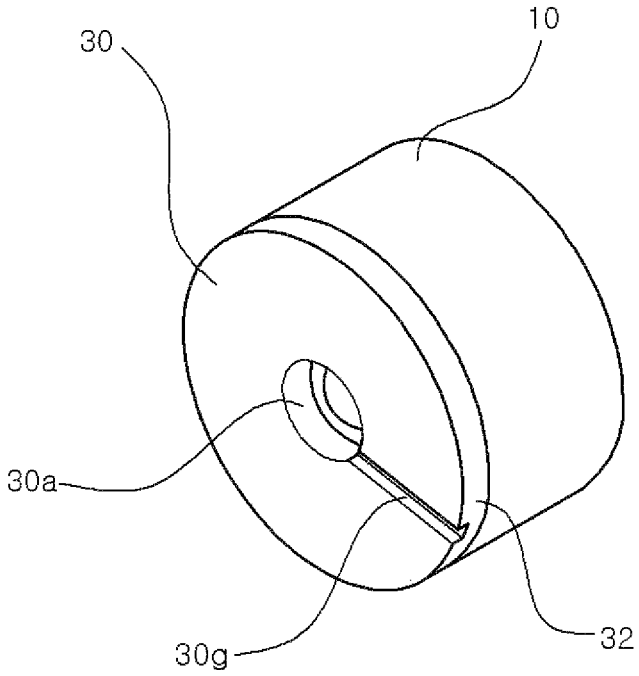
FIG. 10



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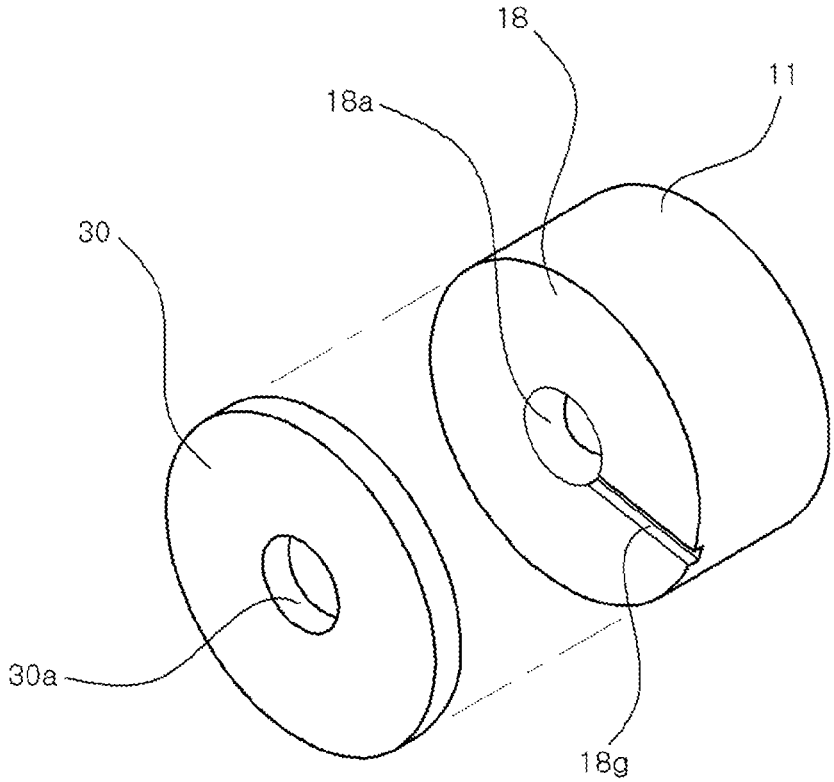
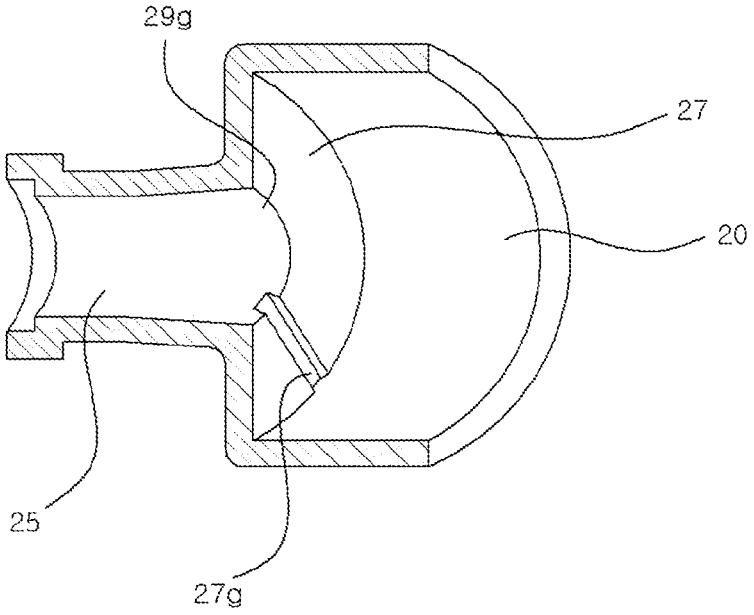


FIG. 12



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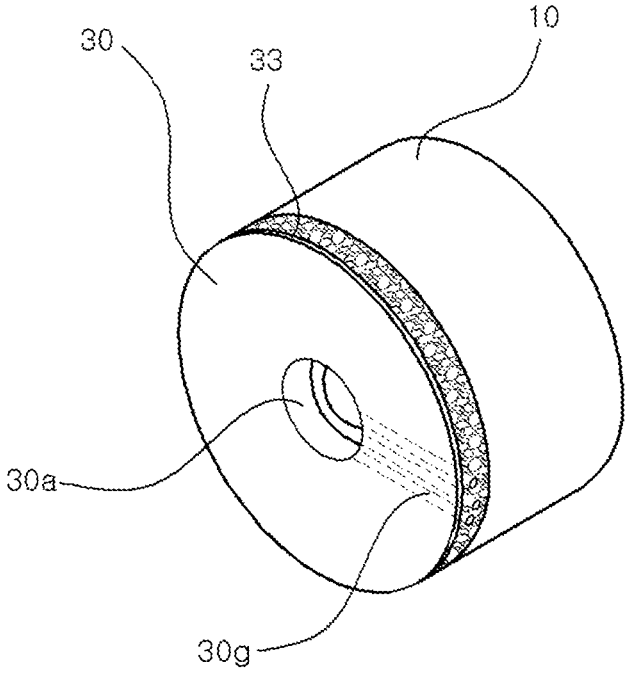

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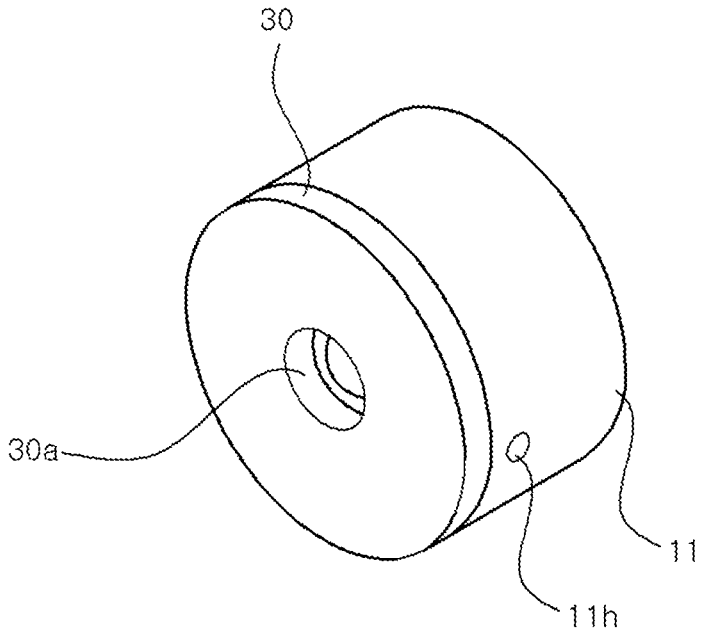

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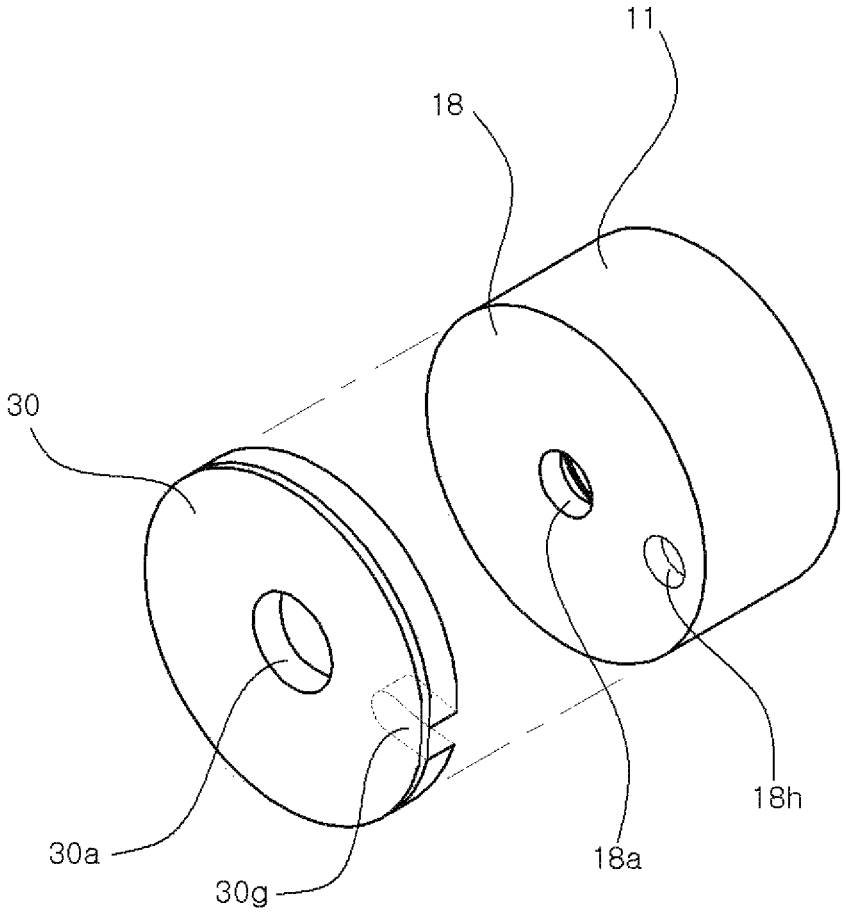

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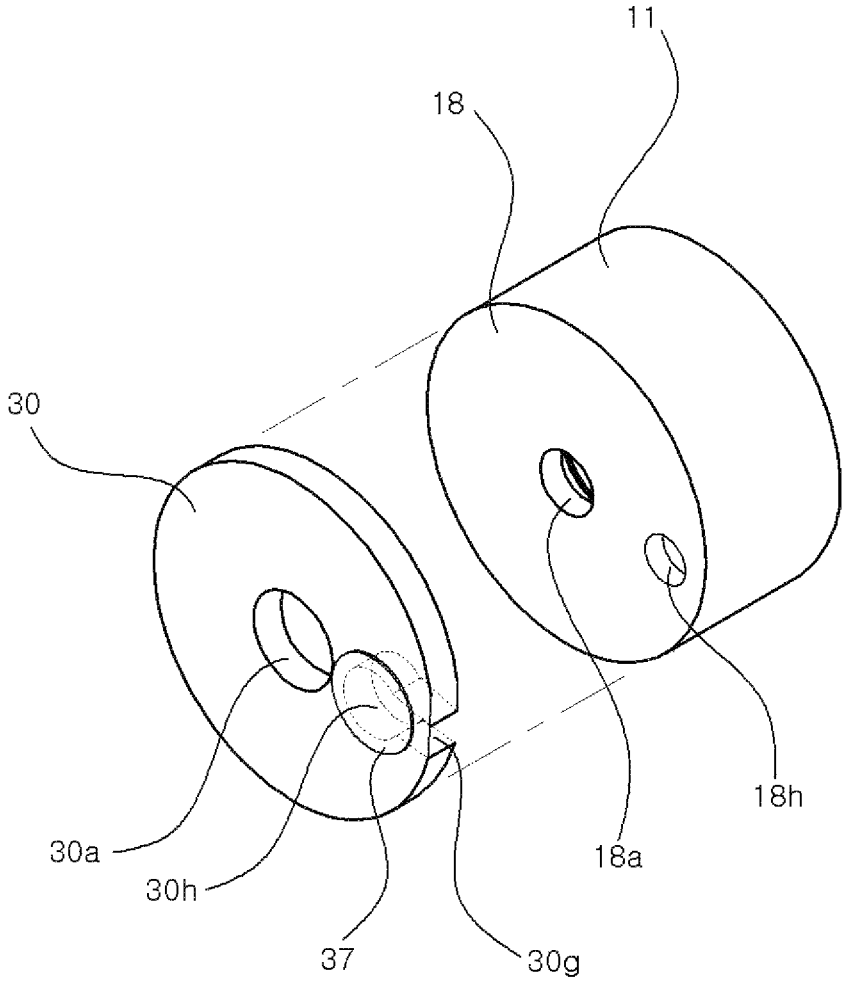
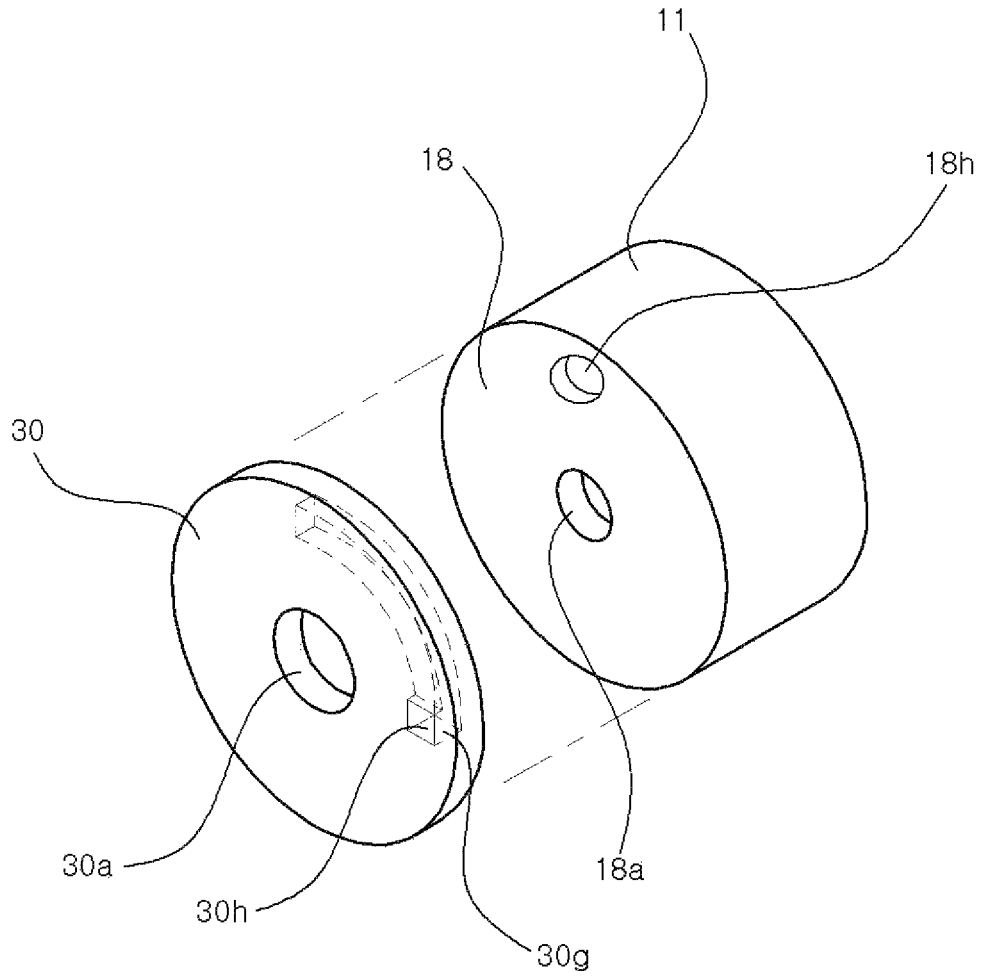


FIG. 17



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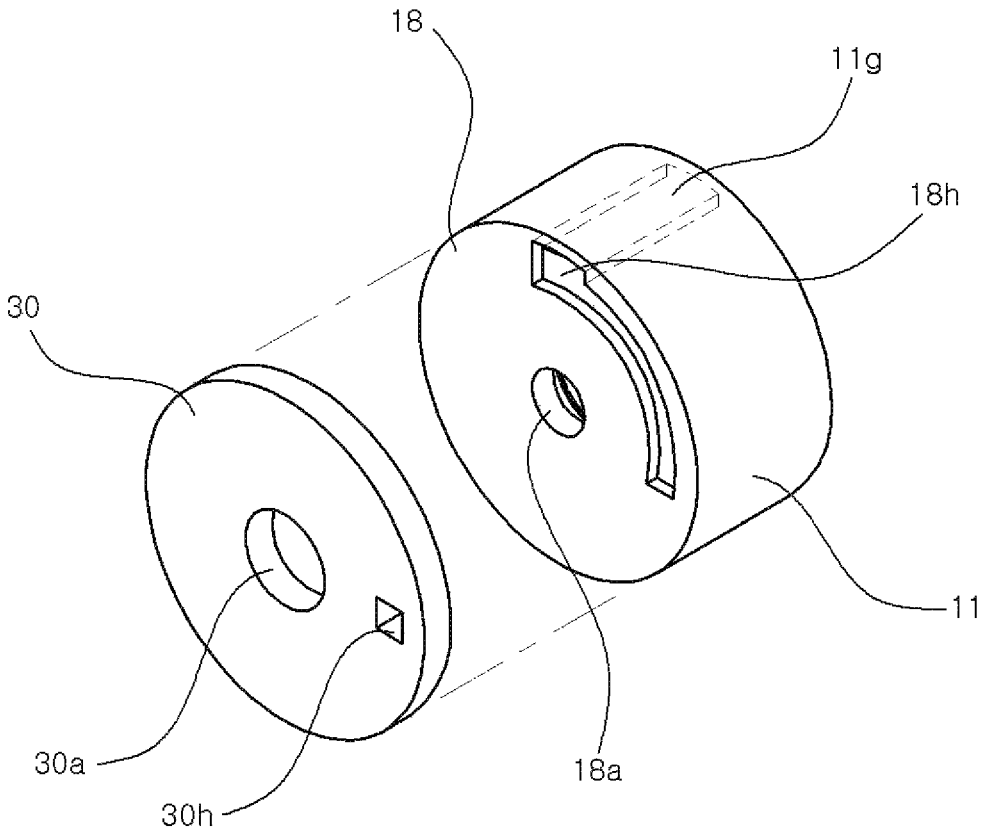
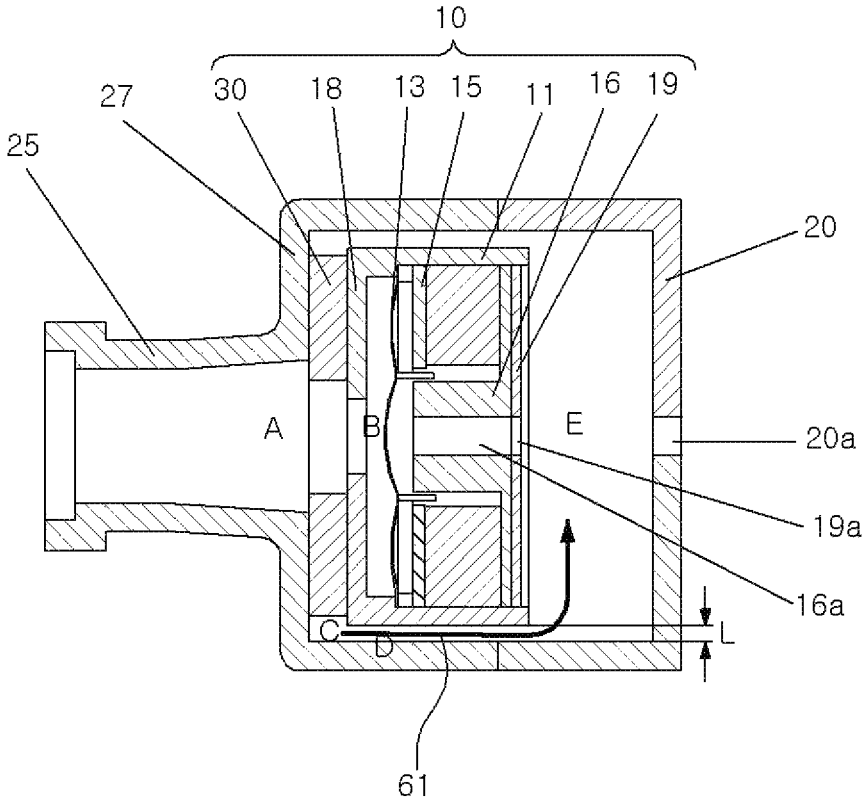


FIG. 19



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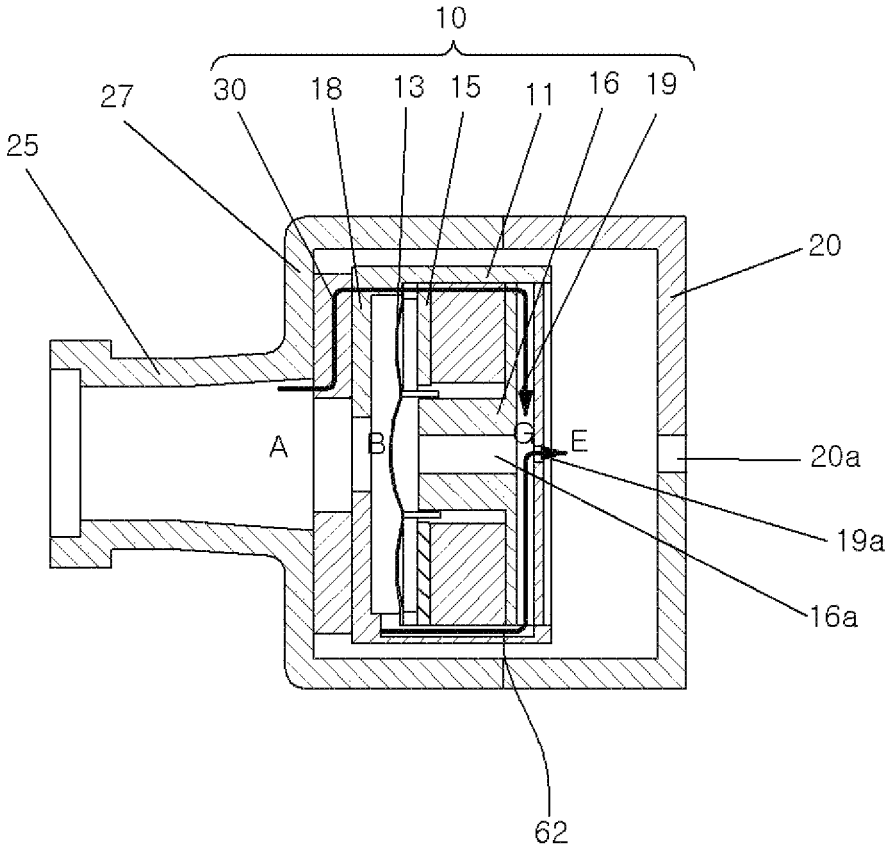

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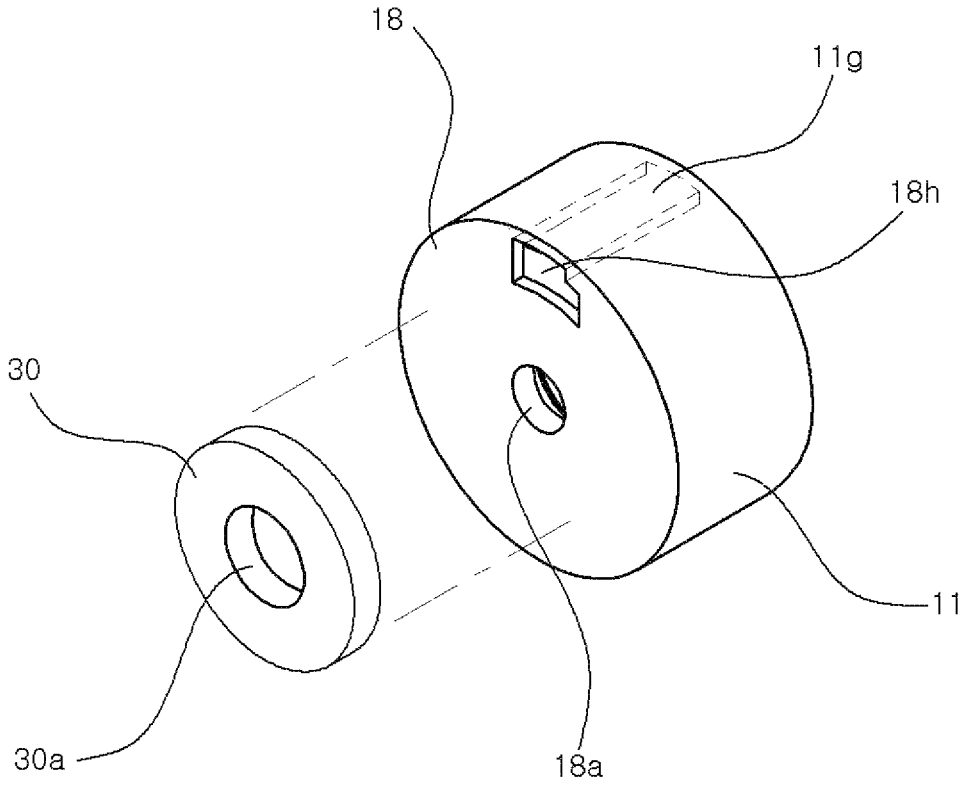

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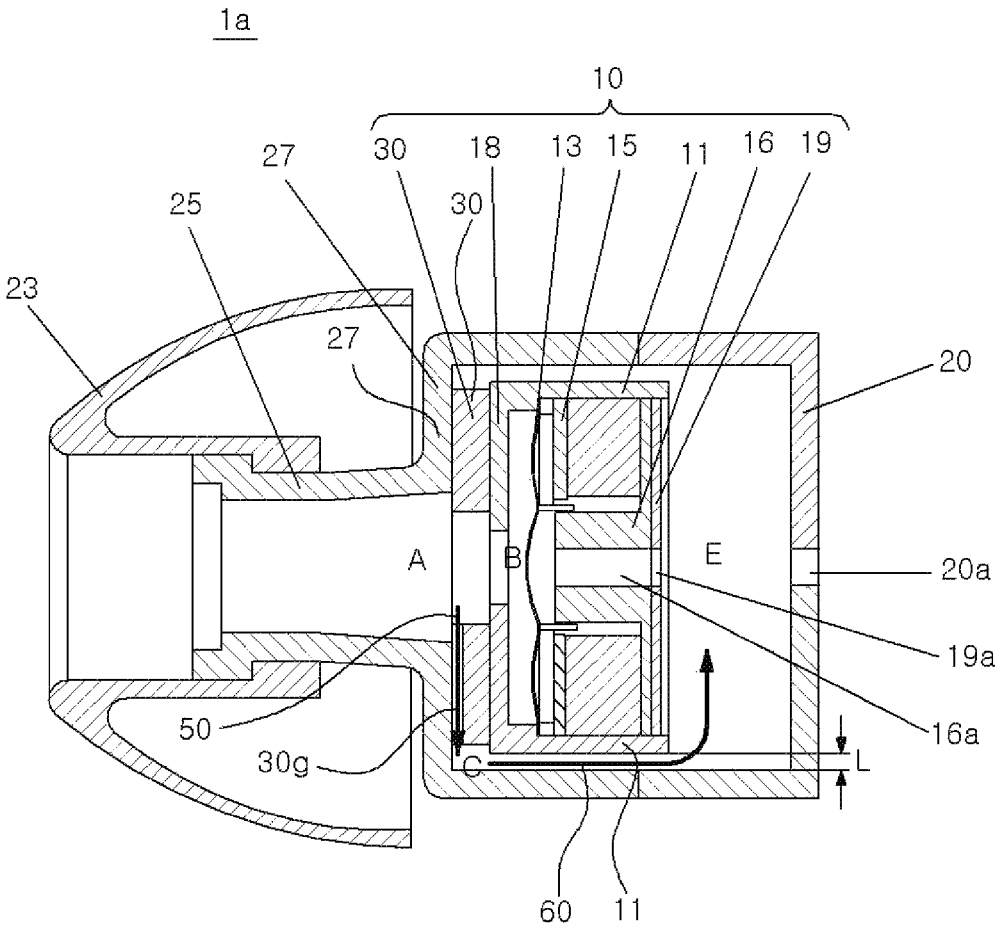
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FIG. 23

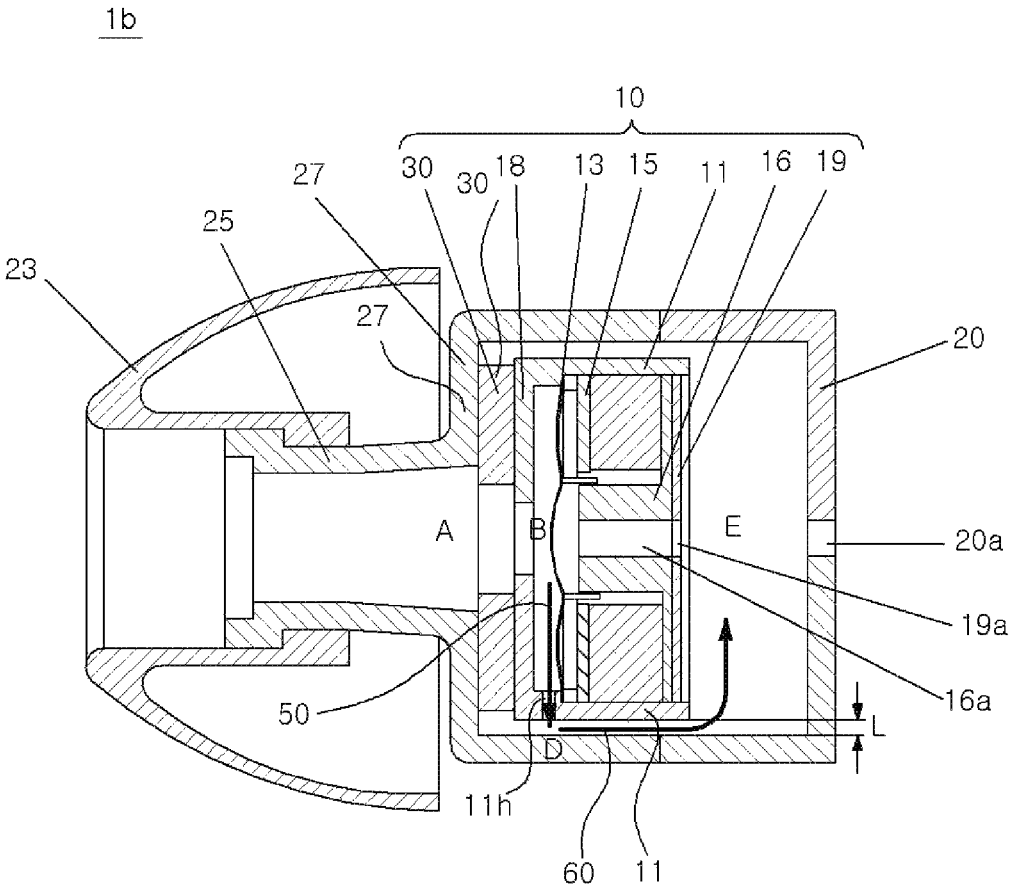
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FIG. 24

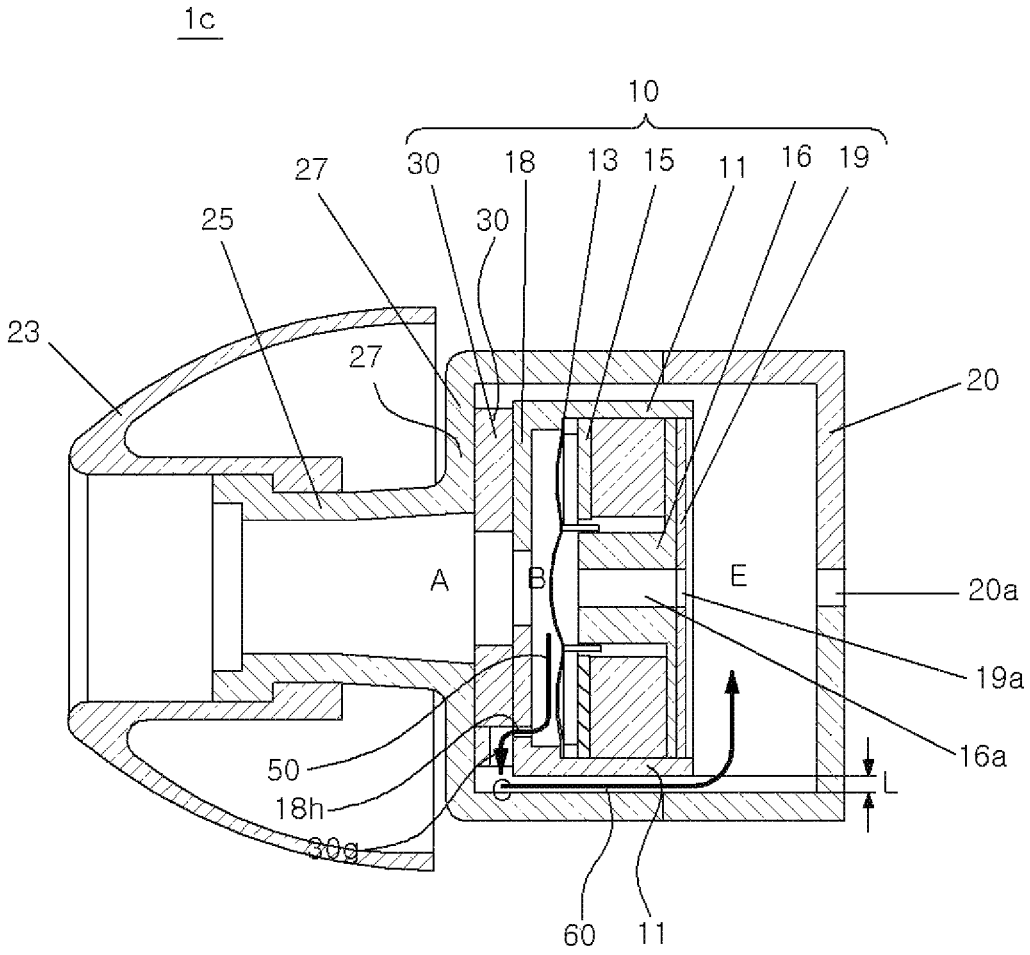
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FIG. 25

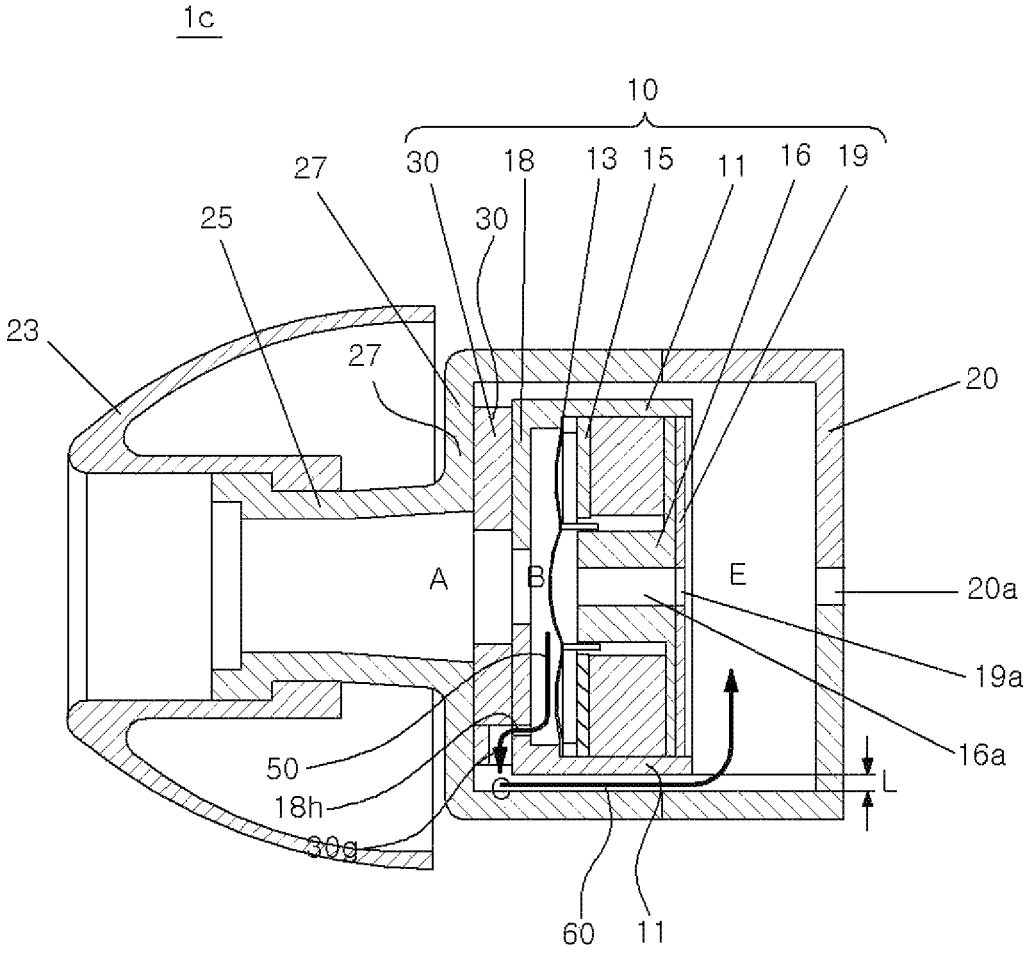
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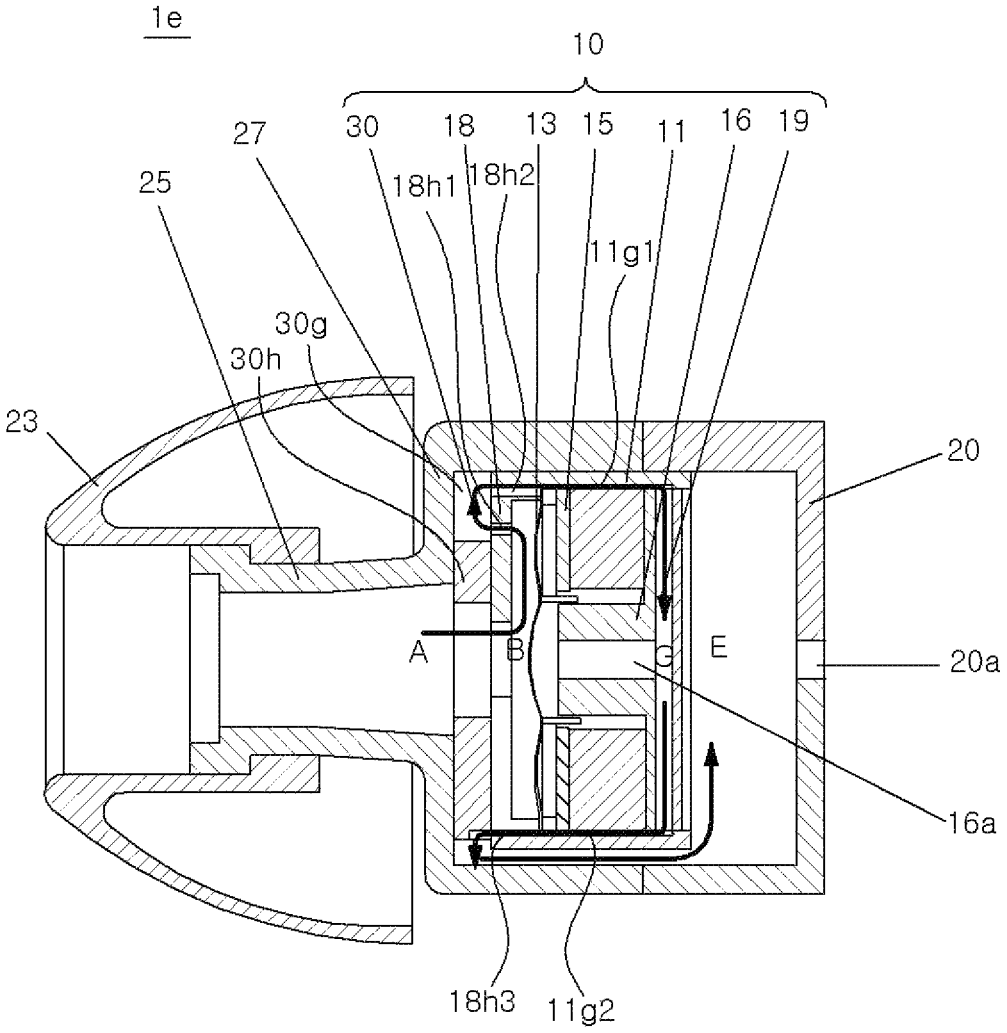
FIG. 26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18h3
11g2

FIG. 27

CANAL TYPE EARPHONE WITH PRESSURE EQUILIBRIUM MEANS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a canal type earphone, and more particularly to a canal type earphone with a pressure equilibrium means, capable of eliminating a pressure difference between a user's external auditory meatus and an outside during wearing of the canal type earphone.

2. Description of the Related Art

A canal type earphone is a type of a speaker converting electric energy into acoustic energy, and enables listening by transferring vibration to an eardrum of an ear instead of emitting sound into a space.

The canal type earphone is put in a user's ear and enables speaker sound to be directly transferred into the user's ear. Since the canal type earphone enables listening to sound even at small output and rarely causes discomfort to those around a user in the course of listening, it is widely used for audio equipment such as a mobile phone and an MP3 player.

Earphones may be mainly classified into an open type earphone and a canal type earphone according to a method of wearing them on the ear. The open type earphone is adapted to wear the earphone as if to put it on an ear, and deteriorates sound insulation due to generation of a space therebetween since people have different ear shapes. On the other hand, the canal type earphone is adapted to insert the earphone into a user's ear, and uses earpieces (tips) having various sizes. Accordingly, the canal type earphone is wearable and has excellent sound insulation, compared to the open type earphone.

Although the canal type earphone is suitable to be used in a noisy place because of having excellent sound insulation, there is a problem in that a differential pressure may be generated due to a complete blockage between a user's external auditory meatus and an outside.

FIG. **1** shows an example of a conventional canal type earphone **1**. As shown in the drawing, the canal type earphone includes a speaker unit **10**, a housing **20** receiving the speaker unit **10**, and an earpiece **23** installed on an outer surface of a cylindrical tube **25** which is integrally formed at the front of the housing **20**.

The housing **20** defines a space for receiving the speaker unit **10**, and is divided into a first housing **11***a* and a second housing **11***b* so as to easily mount the speaker unit **10**. The tube **25** is integrally formed on a front surface of a first housing **11** so as to emit sound emitted from the speaker unit **10** into a user's ear. The tube **25** has a cylindrical shape and the earpiece **23** is fitted on an outer surface of the tube **25**.

The earpiece **23** is made of a soft material such as silicon, and is formed of a shape and size corresponding to a user's external auditory meatus. The earpiece **23** is inserted into the user's external auditory meatus, thereby preventing sound emitted from the speaker unit **10** from leaking to the outside or preventing external noise from being transferred into the user's ear.

As shown in FIG. **2**, when a user inserts the canal type earphone **1** into a user's external auditory meatus **2**, the user's external auditory meatus **2** is completely blocked from the outside by the earpiece **23** installed to the canal type earphone **1**. When the speaker unit **10** vibrates in a state in which air within the user's external auditory meatus may not be discharged to the outside, a pressure in the external auditory meatus is gradually increased so that a pressure difference is generated between the inside of the external auditory meatus and outdoor air.

As such, when a pressure difference is generated between the external auditory meatus and the outside, an eardrum **3** inside the external auditory meatus **2** is pressurized. For this reason, a user may not properly listen to sound emitted from the speaker unit **10**, and a user's eardrum is also damaged in severe cases.

To solve these problems, the conventional canal type earphone has a vent groove g formed on an inside surface of the earpiece **23** coupled to the tube **25** or a vent hole h formed on the tube coupled with the earpiece, as shown in FIG. **1**. Consequently, it may be possible to prevent generation of a differential pressure by discharging air within the external auditory meatus to the outside through the vent groove g or the vent hole h.

However, when the vent groove g is formed between the earpiece and the housing or the vent hole h is formed on the tube wrapped by the earpiece as in the related art, there is a problem in that the vent groove g or the vent hole h may be closed by the earpiece or the external auditory meatus when the earpiece is inserted into the external auditory meatus.

In addition, since the conventional vent groove g or the conventional vent hole h has a very short length for air passage and air within the tube is immediately discharged to the outside, there is a problem in that it is difficult to minutely adjust a discharge amount of air.

[Patent Document] Korean Patent Publication No. 10-0633050 (canal type earphone)

SUMMARY OF THE INVENTION

Therefore, the present invention has been made in view of the above problems, and it is an object of the present invention to provide a canal type earphone with a pressure equilibrium means, capable of eliminating a differential pressure such that air in an external auditory meatus may be discharged rearward of a speaker unit during wearing of the canal type earphone, of minimizing a change in sound to have good sound quality, and of preventing damage of an eardrum.

It is another object of the present invention to provide a canal type earphone with a pressure equilibrium means, capable of installing an air passage, through which air in an external auditory meatus is discharged rearward of a speaker unit, to the speaker unit so as to prevent the air passage from being closed by an earpiece or the external auditory meatus.

It is a further object of the present invention to provide a canal type earphone with a pressure equilibrium means, capable of adjusting a discharge amount of air by lengthways forming an air passage through which air in an external auditory meatus is discharged rearward of a speaker unit.

In accordance with an aspect of the present invention, the above and other objects can be accomplished by the provision of a canal type earphone with a pressure equilibrium means, the canal type earphone including a speaker unit, a housing receiving the speaker unit, and an earpiece installed on an outer surface of a tube which is integrally formed at the front of the housing, the canal type earphone having a gasket installed between the speaker unit and the housing, the canal type earphone including a pressure equilibrium means for discharging air within the tube or air within (between a cover and a vibration plate) the speaker unit to the rear of the speaker unit.

The pressure equilibrium means may include a side air passage through which air within the tube or air within the speaker unit is discharged to a side surface of the gasket or a

side surface of the speaker unit, and a rear air passage through which air in the side surface of the speaker unit is discharged to the rear of the speaker unit.

The side air passage may be configured of a vent groove which is radially formed on a front or back surface of the gasket, and the vent groove may be connected, at one end thereof, to a through-hole formed at a center of the gasket while being connected, at the other end thereof, to the side surface of the gasket.

The side air passage may be configured of a vent groove which is radially formed on a front surface of a cover integrally formed at a front end of a frame constituting the speaker unit, and the vent groove may be connected, at one end thereof, to a through-hole formed at a center of the cover while being connected, at the other end thereof, to a side surface of the cover.

The side air passage may be configured of a vent groove which is formed on a front surface plate, the front surface plate being integrally formed at a front end of the housing such that the gasket is pressed against the front surface plate, and the vent groove may be connected, at one end thereof, to a through-hole formed at a center of the front surface plate while being connected, at the other end thereof, to an edge of the front surface plate.

The side air passage may be configured of a vent hole formed on a cover and a vent groove formed on a back surface of the gasket installed on a front surface of the cover, the vent hole may be formed at a position spaced apart from a through-hole formed at a center of the cover by a predetermined distance, and the vent groove may be connected, at one end thereof, to the vent hole while being connected, at the other end thereof, to the side surface of the gasket.

The side air passage may be configured of a first vent hole formed on the gasket installed on a front surface of a cover, a vent groove formed on a back surface of the gasket, and a second vent hole formed on the cover, the first vent hole may be formed at a position spaced apart from a through-hole formed at a center of the gasket by a predetermined distance, the second vent hole may be formed at a position spaced apart from a through-hole formed at a center of the cover by a predetermined distance, and the vent groove may be connected, at one end thereof, to the first vent hole while being connected, at the other end thereof, to the second vent hole.

The side air passage may be configured of a through-hole formed at a center of a cover and a through-hole formed on a side surface of a frame constituting the speaker unit, and the through-hole may be formed between the cover and a vibration plate installed within the frame.

The rear air passage may be configured of a gap formed between an inside surface of the housing and an outside surface of the speaker unit.

The rear air passage may be configured of a vent groove formed on an inside surface of a frame constituting the speaker unit.

The rear air passage may be configured of a through-hole formed at one side of a cover and a vent groove formed on an inside surface of a frame constituting the speaker unit such that the vent groove is connected to the through-hole.

The pressure equilibrium means may include an inside rear air passage through which air within the tube is discharged between a bracket and a yoke of the speaker unit, an inside front air passage through which air between the yoke and the bracket is discharged to the front of the speaker unit, and a rear air passage through which air in the front of the speaker unit is discharged to the rear of the speaker unit.

The inside rear air passage may be configured of a vent hole formed at one side of a cover and a vent groove formed on an inside surface of a frame constituting the speaker unit, the vent hole may be installed at a position spaced apart from a through-hole formed at a center of the cover and the side surface of the gasket by a predetermined distance, and the vent groove may be connected, at an upper end thereof, to the vent hole while being connected, at a lower end thereof, between the bracket and the yoke within the speaker unit.

The inside front air passage may be configured of a vent groove formed on an inside surface of a frame constituting the speaker unit and a vent hole formed at one side of a cover, the vent hole may be installed at a position spaced apart from a through-hole formed at a center of the cover and the side surface of the gasket by a predetermined distance, and the vent groove may be connected, at an upper end thereof, to the vent hole while being connected, at a lower end thereof, between the bracket and the yoke within the speaker unit.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. **1** is a cross-sectional view illustrating an example of a conventional canal type earphone;

FIG. **2** is a cross-sectional view illustrating a state of wearing the conventional canal type earphone;

FIG. **3** is a cross-sectional view illustrating a canal type earphone with a pressure equilibrium means according to the present invention;

FIG. **4** is a cross-sectional view illustrating an example of a pressure equilibrium means according to the present invention;

FIG. **5** is a cross-sectional view illustrating another example of the pressure equilibrium means according to the present invention;

FIG. **6** is a cross-sectional view illustrating a first embodiment of the canal type earphone with a pressure equilibrium means according to the present invention;

FIG. **7** is a cross-sectional view illustrating a second embodiment of the canal type earphone with a pressure equilibrium means according to the present invention;

FIG. **8** is a cross-sectional view illustrating a third embodiment of the canal type earphone with a pressure equilibrium means according to the present invention;

FIG. **9** is a cross-sectional view illustrating a fourth embodiment of the canal type earphone with a pressure equilibrium means according to the present invention;

FIG. **10** is a cross-sectional view illustrating a fifth embodiment of the canal type earphone with a pressure equilibrium means according to the present invention;

FIGS. **11** to **19** are views illustrating various embodiments of a side air passage according to the present invention;

FIG. **20** is a cross-sectional view illustrating a first embodiment of a rear air passage according to the present invention;

FIG. **21** is a cross-sectional view illustrating a second embodiment of the rear air passage according to the present invention;

FIG. **22** is a cross-sectional view illustrating an inside rear air passage and an inside front air passage according to the present invention; and

FIGS. **23** to **27** are cross-sectional views illustrating various embodiments of the canal type earphone with a pressure equilibrium means according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Hereinafter, a canal type earphone with a pressure equilibrium means according to the present invention will be described in more detail with reference to the drawings.

FIG. **3** is a cross-sectional view illustrating a canal type earphone with a pressure equilibrium means according to the present invention. As shown in the drawing, the canal type earphone with a pressure equilibrium means **1** according to the present invention mainly includes a speaker unit **10**, a housing **20** receiving the speaker unit **10**, an earpiece **23** installed on an outer surface of a tube **25** which is integrally formed at the front of the housing **20**, and a pressure equilibrium means **40** which eliminates a pressure difference between an external auditory meatus and an outside by discharging air within the tube **25** to the rear of the speaker unit **10**.

The cylindrical tube **25** is integrally formed at the front of the housing **20** so as to emit sound emitted from the speaker unit **10** into a user's ear. The earpiece **23** is inserted into a user's external auditory meatus, thereby preventing sound emitted from the speaker unit **10** from leaking to the outside or preventing external noise from being transferred into the user's ear.

The housing **20** is formed integrally with a front surface plate **27** against which the speaker unit **10** is pressed. The front surface plate **27** is configured of a flat plate such that the speaker unit **10** is pressed against the front surface plate **27**, and is formed, at a center thereof, with a through-hole **27***a* connected with the tube **25**.

The speaker unit **10** installed within the housing **20** includes a cylindrical frame **11**, a magnetic circuit **12** installed within the frame **11**, and a vibration plate **13** which vertically vibrates by magnetic force of the magnetic circuit **12**. The magnetic circuit **12** includes a magnet **14**, and a yoke **16** which forms an aperture between the magnet **14** and a plate **15** installed on an upper surface of the magnet **14**.

The aperture is installed with a coil **17**. The vibration plate **13** is attached to an upper end of the coil **17**. The vibration plate **13** is configured of a thin plate, and is fixed, at an edge thereof, to an upper end of the frame **11**. External electric signals are applied to the coil **17**. For this reason, the coil **17** is connected with a connection terminal (not shown).

The frame **11** has a cylindrical shape. A cover **18** is installed on a front surface of the frame **11** and a bracket **19** is installed on a rear surface of the frame **11**. The cover **18** has a through-hole **18***a* formed at a center thereof so that sound generated by the vibration plate **13** is emitted forward through the through-hole **18***a*. The bracket **19** has a through-hole **19***a* formed at a center thereof so that sound generated by the vibration plate **13** is emitted rearward through the through-hole **19***a*. The yoke **16** has a through-hole **16***a* formed at a center thereof so that sound generated by the vibration plate **13** is emitted rearward through the through-hole **16***a*.

A gasket **30** is installed on a front surface of the cover **18**. The gasket **30** is made of an elastic material such as rubber or silicon. The gasket **30** has a through-hole **30***a* formed at a center thereof so that sound emitted from the speaker unit **10** may be emitted through the through-hole **30***a*. The gasket **30** is installed between the front surface plate **27** of the housing **20** and the cover **18** of the speaker unit **10** to prevent sound emitted to the user's external auditory meatus from leaking to the outside.

As shown in the drawing, the canal type earphone **1** according to the present invention is installed with the pressure equilibrium means **40** for eliminating a pressure difference between the user's external auditory meatus and outdoor air by discharging air in the front of the speaker unit **10** to the rear of the speaker unit **10**.

In more detail, the pressure equilibrium means **40** enables air in the inside A of the tube **25**, air in the inside B of the speaker unit **10**, or air in the rear E of the speaker unit **10** to mutually flow. The pressure equilibrium means **40** forms an air passage through which air in the user's external auditory meatus may be discharged rearward of the speaker unit **10**, so as not to generate a pressure difference between the user's external auditory meatus and the outside, thereby having good sound quality and preventing damage of a user's eardrum.

FIG. **4** is a cross-sectional view specifically illustrating an example of the pressure equilibrium means **40** according to the present invention. As shown in the drawing, the pressure equilibrium means **40** according to the present invention includes a side air passage **50** through which air in the inside A of the tube **25** or air in the inside B of the speaker unit **10** is discharged to a side surface C of the gasket **30** or a side surface D of the speaker unit **10**, and a rear air passage **60** through which air in the side surface C of the gasket **30** or the side surface D of the speaker unit **10** is discharged to the rear E of the speaker unit **10**.

In addition, as shown in FIG. **5**, the pressure equilibrium means **40** according to the present invention includes an inside rear air passage **70** through which air in the inside A of the tube **25** is discharged to a clearance G between the bracket **19** and the yoke **16** of the speaker unit **10**, an inside front air passage **80** through which air in the clearance G between the bracket **19** and the yoke **16** of the speaker unit **10** is discharged to the front surface or side surface D of the speaker unit **10**, and a rear air passage **60** through which air in the side surface D of the speaker unit **10** is discharged to the rear E of the speaker unit **10**.

The pressure equilibrium means **40** according to the present invention discharges air in the inside A of the tube **25** or air in the inside B of the speaker unit **10** to the rear E of the speaker unit **10** by means of using an air passage configured of the side air passage **50** and rear air passage **60**, or the inside rear air passage **70**, inside front air passage **80**, and rear air passage **60**.

Since the pressure equilibrium means **40** according to the present invention may minutely adjust a discharge amount of air by lengthways extending the length of the air passage and bending the air passage in a direction of 90 degrees by means of using the side air passage **50** and rear air passage **60**, or the inside rear air passage **70**, inside front air passage **80**, and rear air passage **60**, etc.

Hereinafter, various embodiments of the canal type earphone with a pressure equilibrium means according to the present invention will be described.

First, a first embodiment **1***a* of the canal type earphone with a pressure equilibrium means according to the present invention includes a side air passage **50** through which air in the inside A of the tube **25** is discharged to the side surface C of the gasket **30**, and a rear air passage **60** through which air in the side surface C of the gasket **30** is discharged to the rear E of the speaker unit **10**, as shown in FIG. **6**.

As shown in FIG. **7**, a second embodiment **1***b* of the canal type earphone with a pressure equilibrium means according to the present invention includes a side air passage **50** through which air in the inside A of the tube **25** is introduced to the inside B of the speaker unit **10** and air in the inside B of the speaker unit **10** is discharged to the side surface C of the gasket **30**, and a rear air passage **60** through which air in the side surface C of the gasket **30** is discharged to the rear E of the speaker unit **10**.

As shown in FIG. **8**, a third embodiment **1***c* of the canal type earphone with a pressure equilibrium means according to the present invention includes a side air passage **50** through which air in the inside A of the tube **25** is introduced to the inside B of the speaker unit **10** and air in the inside B of the

speaker unit **10** is discharged to the side surface D of the speaker unit **10**, and a rear air passage **60** through which air in the side surface D of the speaker unit **10** is discharged to the rear E of the speaker unit **10**.

As shown in FIG. **9**, a fourth embodiment **1***d* of the canal type earphone with a pressure equilibrium means according to the present invention includes a side air passage **50** through which air in the inside A of the tube **25** is introduced to the inside B of the speaker unit **10**, and an inside rear air passage **70** through which air in the inside B of the speaker unit **10** is discharged to the clearance G between the bracket and the yoke **16** of the speaker unit **10** and is then discharged to the rear E of speaker unit **10** through the through-hole **19***a* formed on the bracket **19**.

As shown in FIG. **10**, a fifth embodiment **1***e* of the canal type earphone with a pressure equilibrium means according to the present invention includes a side air passage **50** through which air in the inside A of the tube **25** is discharged to the back surface of the gasket **30**, an inside rear air passage **70** through which air in the back surface of the gasket **30** is discharged to the clearance G between the bracket **19** and the yoke **16** of the speaker unit **10**, an inside front air passage **80** through which air in the clearance G between the bracket **19** and the yoke **16** of the speaker unit **10** is discharged to the side surface C of the gasket **30**, and a rear air passage **60** through which air in the side surface C of the gasket **30** is discharged to the rear E of the speaker unit **10**.

Hereinafter, various embodiments of the side air passage and the rear air passage according to the present invention will be described.

First, FIG. **11** shows a first embodiment **51** of the side air passage according to the present invention. As shown in the drawing, a first side air passage **51** is configured of a vent groove **30***g* formed on the front or back surface of the gasket **30**. The vent groove **30***g* formed on the gasket **30** has a predetermined depth. The vent groove **30***g* is connected, at one end thereof, to a through-hole **30***a* formed at the center of the gasket **30** while being connected, at the other end thereof, to an edge **32** of the gasket **30**. Accordingly, air in the inside A of the tube **25** is discharged to the outside C of the edge **32** of the gasket **30** through the through-hole **30***a* formed at the center of the gasket **30** and the vent groove **30***g* formed on the front or back surface of the gasket **30**.

Next, FIG. **12** shows a second embodiment **52** of the side air passage. As shown in the drawing, a second side air passage **52** is configured of a vent groove **18***g* formed on the front surface of the cover **18**. The vent groove **18***g* formed on the cover **18** has a predetermined depth. The vent groove **18***g* is connected, at one end thereof, to a through-hole **18***a* formed at the center of the cover **18** while being connected, at the other end thereof, to a side surface of the cover **18**. Accordingly, air in the inside A of the tube **25** is discharged to the side surface C of the cover **18** through the through-hole **18***a* formed at the center of the cover **18** and the vent groove **18***g* formed on the front surface of the cover **18**.

FIG. **13** shows a third embodiment **53** of the side air passage. As shown in the drawing, a third side air passage **53** is configured of a vent groove **27***g* formed on the rear surface of the front surface plate **27** of the housing **20**. A through-hole **27***a* connected to the tube **25** is formed at the center of the front surface plate **27**. The vent groove **27***g* formed on the front surface plate **27** has a predetermined depth. The vent groove **27***g* is connected, at one end thereof, to the through-hole **27***a* formed at the center of the front surface plate **27** while being connected, at the other end thereof, to an edge of the front surface plate **27**. Accordingly, air in the inside A of the tube **25** is discharged to the edge of the front surface plate **27** through the through-hole **27***a* formed at the center of the front surface plate **27** and the vent groove **27***g* radially formed on the rear surface of the front surface plate **27**.

FIG. **14** shows a fourth embodiment **54** of the side air passage. As shown in the drawing, a fourth side air passage is configured of a plurality of vent holes **30***h* formed within the gasket **30**. The gasket **30** is made of a porous material and has a plurality of apertures formed therein. The vent holes **30***h* are formed by connection of the plural apertures. Each of the vent hole **30***h* is connected, at one end thereof, to a through-hole **30***a* formed at the center of the gasket **30** while being connected, at the other end thereof, to an edge of the gasket **30**. In this case, a reinforcement film is may be attached to the front surface of the gasket **30**. Accordingly, air in the inside A of the tube **25** may be discharged to the side surface of the gasket **30** through the plural vent holes **30***h* formed on the gasket **30**.

FIG. **15** shows a fifth embodiment **55** of the side air passage. As shown in the drawing, a fifth side air passage **55** is configured of a vent hole **11***h* formed on the side surface of the frame **11** of the speaker unit **10**. The vent hole **11***h* is formed between the cover **18** and the vibration plate **13**. Accordingly, air in the inside A of the tube **25** may be introduced to the inside of the speaker unit **10** through the through-hole **18***a* formed on the cover **18** and air in the inside B of the speaker unit **10** may be discharged to the side surface D of the speaker unit **10** through the vent hole **11***h* formed on the frame **11**.

FIG. **16** shows a sixth embodiment **56** of the side air passage. As shown in the drawing, a sixth side air passage **56** is configured of a vent hole **18***h* formed at one side of the cover **18** of the speaker unit **10** and a vent groove **30***g* formed on the lower surface of the gasket **30**. The vent hole **18***h* is formed at a position spaced apart from a through-hole **18***a* formed at the center of the cover **18** by a predetermined distance. The vent groove **30***g* is formed of a predetermined depth on the lower surface of the gasket **30**. The vent groove **30***g* is connected, at one end thereof, to the vent hole **18***h* while being connected, at the other end thereof, to an edge **32** of the gasket **30**. Accordingly, air in the inside A of the tube **25** may be introduced to the inside B of the speaker unit **10** through the through-hole **18***a* formed on the cover **18**, air in the inside B of the speaker unit **10** may be discharged to the vent groove **30***g* formed on the back surface of the gasket **30** through the vent hole **18***h* formed on the cover **18**, and air discharged to the back surface of the gasket **30** may be discharged to the edge **32** of the gasket **30** through the vent groove **30***g*.

FIG. **17** shows a seventh embodiment **57** of the side air passage. As shown in the drawing, a seventh side air passage **57** is configured of a first vent hole **18***h* formed at one side of the cover **18**, a second vent hole **30***h* formed on the gasket **30** to correspond to the first vent hole **18***h*, and a vent groove **30***g* formed on the lower surface of the gasket **30** to be connected to the second vent hole **30***h*. The first vent hole **18***h* is formed at a position spaced apart from a through-hole **18***a* formed at the center of the cover **18** by a predetermined distance, and the second vent hole **30***h* is formed at a position corresponding to the first vent hole **18***h*. In this case, the second vent hole **30***h* is formed to have a diameter greater than the first vent hole **18***h*. A damping film **37** is attached to the upper surface of the second vent hole **30***h* so as to close the opened surface of the second vent hole **30***h*. The vent groove **30***g* has a predetermined depth. The vent groove **30***g* is connected, at one end thereof, to the first vent hole **18***h* while being connected, at the other end thereof, to an edge **32** of the gasket **30**. Accordingly, air in the inside A of the tube **25** may be introduced to the inside B of the speaker unit **10** through the through-hole **18***a* formed on the cover **18**, air in the inside B of the speaker unit **10** may be discharged to the second vent hole **30***h* formed on

the gasket **30** through the first vent hole **18***h* formed on the cover **18**, and air discharged to the second vent hole **30***h* of the gasket **30** may be discharged to the edge **32** of the gasket **30** through the vent groove **30***g* formed on the gasket **30**. As such, the present invention may adjust a discharge amount of air discharged through the air passage by adjusting the size of the diameter of the vent hole **30***h* formed on the gasket **30** and changing a material of the damping film **37** attached to the vent hole **30***h*.

FIG. **18** shows an eighth embodiment **58** of the side air passage. As shown in the drawing, an eighth side air passage **58** is configured of a first vent hole **30***h* formed at one side of the gasket **30**, a vent groove **30***g* formed on the back surface of the gasket **30** to be connected to the first vent hole **30***h*, and a second vent hole **18***h* formed on the cover **18** to be connected to the vent groove **30***g*. The first vent hole **30***h* formed on the gasket **30** is formed at a position spaced apart from a through-hole **18***a* formed at the center of the cover **18** by a predetermined distance. The vent groove **30***g* formed on the back surface of the gasket **30** has a predetermined depth. The vent groove **30***g* is connected, at one end thereof, to the first vent hole **30***h* while being connected, at the other end thereof, to the second vent hole **18***h*. Accordingly, air in the inside A of the tube **25** is discharged to the back surface of the gasket **30** through the first vent hole **30***h* formed on the gasket **30**, and air discharged to the back surface of the gasket **30** is discharged to the inside of the speaker unit **10** through the vent groove **30***g* formed on the back surface of the gasket **30** and the second vent hole **18***h* formed on the cover **18**.

FIG. **19** shows a ninth embodiment **59** of the side air passage. As shown in the drawing, a ninth side air passage **59** is configured of a first vent hole **30***h* formed at one side of the gasket **30**, a vent groove **18***g* formed on the front surface of the cover **18** to be connected to the first vent hole **30***h*, and a second vent hole **18***h* formed on the cover **18** to be connected to the vent groove **18***g*. The first vent hole **30***h* formed on the gasket **30** is formed at a position spaced apart from a through-hole **18***a* formed at the center of the cover **18** by a predetermined distance. The vent groove **18***g* formed on the cover **18** has a predetermined depth. The vent groove **18***g* is connected, at one end thereof, to the first vent hole **30***h* while being connected, at the other end thereof, to the second vent hole **18***h*. Accordingly, air in the inside A of the tube **25** is discharged to the front surface of the cover **18** through the first vent hole **30***h* formed on the gasket **30**, and air discharged to the front surface of the cover **18** is discharged to the inside of the speaker unit **10** through the second vent hole **18***h* formed on the cover **18**. Accordingly, air in the inside A of the tube **25** is discharged to the front surface of the cover **18** through the first vent hole **30***h* formed on the gasket **30**, and air discharged to the front surface of the cover **18** is discharged to the inside of the speaker unit **10** through the vent hole **18***h* formed on the cover **18**.

FIG. **20** shows a first embodiment **61** of the rear air passage. As shown in the drawing, an inside rear air passage **61** is configured of a gap L formed between the inside surface of the housing **20** and the outside surface **11***a* of the speaker unit **20**. In this case, the gap L may be configured by forming a protrusion having a predetermined height on the inside surface **21** of the housing **20** or the outside surface **11***a* of the speaker unit **20**. Accordingly, air in the side surface C of the gasket **30** or the side surface D of the speaker unit **10** may be discharged to the rear E of the speaker unit **10** through the gap L.

FIG. **21** shows a second embodiment **62** of the rear air passage. As shown in the drawing, a rear air passage **62** is configured of a vent groove **11***g* formed on the inside surface **11***b* of the frame **11**. The vent groove **11***g* has a predetermined depth. The vent groove **11***g* is connected, at one end thereof, between the cover **18** and the vibration plate **13** while being connected, at the other end thereof, between the yoke **16** and the bracket **19**. Accordingly, air in the inside B of the speaker unit **10** may be discharged to the rear E of the speaker unit **10** along the vent groove **11***g* formed on the frame **11**.

FIG. **22** shows the inside rear air passage **70** and the inside front air passage **80**. As shown in the drawing, the inside rear air passage **70** and the inside front air passage **80** are configured of a vent hole **18***h* formed on the cover **18** and a vent groove **11***g* formed on the inside surface **11***b* of the frame **11**. The vent groove **11***g* has a predetermined depth. The vent groove **11***g* is connected, at one end thereof, to the vent hole **18***h* formed on the cover **18** while being connected, at the other end thereof, between the yoke **16** and the bracket **19**. Accordingly, air in the inside A of the tube **25** may be discharged to the inside B of the speaker unit **10** through the vent hole **18***h* formed on the cover **18**, and air in the inside B of the speaker unit **10** may be discharged between the yoke **16** and the bracket **19** through the vent groove **11***g* formed on the frame **11**. On the other hand, air between the yoke **16** and the bracket **19** may be discharged to the front B of the speaker unit **10** through the vent groove **11***g* formed on the frame **11** and the vent hole **18***h* formed on the cover **18**.

Hereinafter, various embodiments of the canal type earphone with a pressure equilibrium means according to the present invention will be described in more detail.

First, FIG. **23** shows a first embodiment **1***a* of the canal type earphone with a pressure equilibrium means according to the present invention. As shown in the drawing, the canal type earphone **1***a* according to the present invention mainly includes a speaker unit **10**, a housing **20** receiving the speaker unit **10**, and an earpiece **23** installed on an outer surface of a tube **25** which is integrally formed at the front of the housing **20**.

The cylindrical tube **25** is integrally formed at the front of the housing **20**. The earpiece **23** installed to the tube **25** may be formed to be inserted into a user's external auditory meatus. The housing **20** is formed integrally with a front surface plate **27** against which the speaker unit **10** is pressed, and is formed, at a center thereof, with a through-hole **27***a* connected with the tube **25**.

The speaker unit **10** installed within the housing **20** includes a cylindrical frame **11**, a magnetic circuit **12** installed within the frame **11**, and a vibration plate **13** which vertically vibrates by magnetic force of the magnetic circuit **12**. The frame **11** has a cylindrical shape. A cover **18** is installed on a front surface of the frame **11** and a bracket **19** is installed on a rear surface of the frame **11**.

The cover **18** has a through-hole **18***a* formed at a center thereof so that sound generated by the vibration plate **13** is emitted forward through the through-hole **18***a*. The bracket **19** has a through-hole **19***a* formed at a center thereof so that sound generated by the vibration plate **13** is emitted rearward through the through-hole **19***a*.

A gasket **30** is installed on a front surface of the cover **18**. The gasket **30** has a through-hole **30***a* formed at a center thereof, and is formed of a doughnut shape. A vent groove **30***g* is formed on a front surface of the gasket **30**. The vent groove **30***g* forms a side air passage through which air in the inside A of the tube **25** is discharged to a side surface of the gasket **30**. The vent groove **30***g* has a predetermined depth. The vent groove **30***g* is connected, at one end thereof, to the through-hole **30***a* while being connected, at the other end thereof, to an edge **32** of the gasket **30**.

A uniform gap L is formed between an inside surface **20***a* of the housing **20** and an outside surface **10***a* of the speaker unit **10**. The gap L forms a rear air passage through which air in the side surface C of the gasket **30** is discharged rearward of the speaker unit **10**. In this case, the gap L may be configured by forming a protrusion having a predetermined height on the inside surface **20***a* of the housing **20** or the outside surface **10***a* of the speaker unit **20**.

Accordingly, air in the inside A of the tube **25** may be discharged to the side surface C of the gasket **30** through the vent hole **30***g* formed on the gasket **30**, and air in the side surface C of the gasket **30** may be discharged to the rear E of the speaker unit **10** through the gap L.

FIG. **24** shows a second embodiment **1***b* of the canal type earphone with a pressure equilibrium means according to the present invention. The same reference numbers will be used with respect to parts similar to those of the above-mentioned embodiment, and no detailed description will be given thereof. As shown in the drawing, the canal type earphone **1***b* according to the present invention has a vent hole **11***h* formed on the side surface of the frame **11**. The vent hole **11***h* forms a side air passage through which air in the inside B of the speaker unit **10** is discharged to the side surface D of the speaker unit **10**. In this case, the vent hole **11***h* is formed between the cover **18** and the vibration plate **13**.

A uniform gap L is formed between an inside surface **20***a* of the housing **20** and an outside surface **10***a* of the speaker unit **10**. The gap L forms a rear air passage through which air in the side surface C of the gasket **30** is discharged to the rear E of the speaker unit **10**.

Accordingly, air in the inside A of the tube **25** is introduced to the inside B of the speaker unit **10** through the through-hole **18***a* formed on the cover **18**, and air in the inside B of the speaker unit **10** is discharged to the side surface D of the speaker unit **10** through the vent hole **11***h* formed on the frame **11**. Air in the side surface D of the speaker unit **10** may be discharged to the rear E of the speaker unit **10** through the gap L.

FIG. **25** shows a third embodiment **1***c* of the canal type earphone with a pressure equilibrium means according to the present invention. As shown in the drawing, the canal type earphone **1***c* according to the present invention has a vent hole **18***h* formed on the cover **18** and a vent groove **30***g* formed on the rear surface of the gasket **30** to be connected to the vent hole **18***h*.

The vent hole **18***h* formed on the cover **18** and the vent groove **30***g* formed on the rear surface of the gasket **30** form a side air passage **50** through which air in the inside B of the speaker unit **10** is discharged to the side surface C of the gasket **30**. The vent hole **18***h* is formed at a position spaced apart from a through-hole **18***a* formed at the center of the cover **18** by a predetermined distance. The vent groove **30***g* has a predetermined depth. The vent groove **30***g* is connected, at one end thereof, to the vent hole **18***h* while being connected, at the other end thereof, to an edge **32** of the gasket **30**.

A uniform gap L is formed between an inside surface **20***a* of the housing **20** and an outside surface **10***a* of the speaker unit **10**. The gap L forms a rear air passage through which air in the side surface C of the gasket **30** is discharged to the rear E of the speaker unit **10**.

Accordingly, air in the inside A of the tube **25** is introduced to the inside B of the speaker unit **10** through the through-hole **18***a* formed at the center of the cover **18**, air in the inside B of the speaker unit **10** is discharged to the back surface of the gasket **30** through the vent hole **11***h* formed at one side of the cover **18**, and air discharged to the back surface of the gasket **30** is discharged to the edge **32** of the gasket **30** through the vent groove **30***g*. Air in the side surface D of the speaker unit **10** may be discharged to the rear E of the speaker unit **10** through the gap L.

FIG. **26** shows a fourth embodiment **1***d* of the canal type earphone with a pressure equilibrium means according to the present invention. As shown in the drawing, the canal type earphone **1***d* according to the present invention has a through-hole **18***a* formed at the center of the cover **18**. The through-hole **18***a* serves as a side air passage through which air in the inside of the tube **25** is introduced to the inside of the speaker unit **10**.

A vent groove **11***g* is formed on the inside surface **11***b* of the frame **11**. The vent groove **11***g* has a predetermined depth. The vent groove **11***g* is connected, at one end thereof, between the cover **18** and the vibration plate **13** while being connected, at the other end thereof, between the yoke **16** and the bracket **19**. The vent groove **11***g* forms a rear air passage through which air in the inside B of the speaker unit **10** is discharged to the rear of the speaker unit **10**.

Accordingly, air in the inside A of the tube **25** is introduced to the inside B of the speaker unit **10** through the through-hole **18***a* formed on the cover **18**, air in the inside B of the speaker unit **10** is discharged between the yoke **16** and the bracket **19** through the vent groove **11***g* formed on the inside surface **11***b* of the frame **11**, and air between the yoke **16** and the bracket **19** is discharged to the rear of the speaker unit **10** through the through-hole **19***a* formed on the bracket **19**.

FIG. **27** shows a fifth embodiment **1***e* of the canal type earphone with a pressure equilibrium means according to the present invention. As shown in the drawing, the canal type earphone **1***e* according to the present invention has a first vent hole **18***h***1** formed at one side of the cover **18**. The first vent hole **18***h***1** formed on the cover **18** forms a side air passage through which air in the inside of speaker unit **10** is discharged to the front of the speaker unit **10**.

A first vent groove **11***g***1** is formed at one side on the inside surface **11***b* of the frame **11**. The first vent groove **11***g***1** has a predetermined depth. The first vent groove **11***g***1** is connected, at one end thereof, to a second vent hole **18***h***2** passing through the cover **18** while being connected, at the other end thereof, to the clearance G between the yoke **16** and the bracket **19**. The first vent groove high forms an inside rear air passage through which air in the inside B of the speaker unit **10** is discharged between the yoke **16** and the bracket **19**.

A second vent groove **11***g***2** is formed at the other side on the inside surface **11***b* of the frame **11**. The second vent groove **11***g***2** has a predetermined depth. The second vent groove **11***g***2** is connected, at one end thereof, to the clearance G between the yoke **16** and the bracket **19** while being connected, at the other end thereof, to a third vent hole **18***h***3** formed at the cover **18**. Accordingly, the second vent groove **11***g***2** forms an inside front air passage **80** through which air in the clearance G between the yoke **16** and the bracket **19** is discharged to the side surface C of the gasket **30** or the side surface D of the speaker unit **10**.

A uniform gap L is formed between an inside surface **20***a* of the housing **20** and an outside surface **10***a* of the speaker unit **10**. The gap L forms a rear air passage through which air in the side surface C of the gasket **30** or the side surface D of the speaker unit **10** is discharged to the rear E of the speaker unit **10**.

Accordingly, air in the inside A of the tube **25** may be introduced to the inside B of the speaker unit **10** through the vent hole **18***h***1** formed on the cover **18**, air in the inside B of the speaker unit **10** may be discharged between the yoke **16** and the bracket **19** through the first vent groove **11***g***1** formed on the frame **11**, air between the yoke **16** and the bracket **19**

may be discharged to the side surface C of the gasket **30** or the side surface D of the speaker unit **10** through the second vent groove **11***g***2** formed on the frame **11** and the vent hole **18***h***2** formed on the cover **18**, and air in the side surface C of the gasket **30** or the side surface D of the speaker unit **10** may be discharged to the rear E of the speaker unit **10** through the gap L.

As described above, the canal type earphone with a pressure equilibrium means according to the present invention may discharge air within the tube or air within the speaker unit to the rear of the speaker unit through the side air passage and the rear air passage so that the pressure in the user's external auditory meatus is equilibrated with the outside pressure. In particular, the pressure equilibrium means according to the present invention may minutely adjust a discharge amount of air by lengthways extending the length of the air passage and bending the air passage in a direction of degrees. In addition, the pressure equilibrium means according to the present invention may be installed within the speaker unit to prevent the air passage from being closed by the earpiece or the external auditory meatus.

As is apparent from the above description, the present invention provides a canal type earphone with a pressure equilibrium means, capable of eliminating a pressure difference between an external auditory meatus and an outside during wearing of the canal type earphone so as to minimize a change in sound emitted from a speaker unit and prevent damage of a user's eardrum.

In addition, the present invention provides a canal type earphone with a pressure equilibrium means, capable of forming a side air passage through which air within a tube or air within a speaker unit is discharged to a side surface of a gasket or a side surface of the speaker unit, and a rear air passage through which air in the side surface of the speaker unit is discharged rearward of the speaker unit, so as to adjust a length of an air passage and bend the air passage in a direction of 90 degrees, thereby minutely adjusting a discharge amount of air to have good sound quality.

Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

What is claimed is:

1. A canal type earphone comprising:
a speaker unit;
a housing receiving the speaker unit;
an earpiece installed on an outer surface of a tube which is integrally formed at a front of the housing;
a gasket installed between the speaker unit and the housing; and
a pressure equilibrium means for discharging air within the tube or air within a space between a cover and a vibration plate of the speaker unit to a rear of the speaker unit,
wherein the pressure equilibrium means comprises:
a side air passage through which air within the tube or air within the speaker unit is discharged to a side surface of the gasket or a side surface of the speaker unit; and
a rear air passage through which air in the side surface of the gasket or the side surface of the speaker unit is discharged to the rear of the speaker unit, and
wherein the side air passage is a vent groove which is radially formed on a front or back surface of the gasket, and the vent groove is connected, at one end thereof, to a through-hole formed at a center of the gasket and connected, at another end thereof, to the side surface of the gasket.

2. A canal type earphone comprising:
a speaker unit;
a housing receiving the speaker unit;
an earpiece installed on an outer surface of a tube which is integrally formed at a front of the housing;
a gasket installed between the speaker unit and the housing; and
a pressure equilibrium means for discharging air within the tube or air within a space between a cover and a vibration plate of the speaker unit to a rear of the speaker unit,
wherein the pressure equilibrium means comprises:
a side air passage through which air within the tube or air within the speaker unit is discharged to a side surface of the gasket or a side surface of the speaker unit; and
a rear air passage through which air in the side surface of the gasket or the side surface of the speaker unit is discharged to the rear of the speaker unit, and
wherein the side air passage is a vent groove which is radially formed on a front surface of a cover integrally formed at a front end of a frame constituting the speaker unit, and the vent groove is connected, at one end thereof, to a through-hole formed at a center of the cover, and is connected, at another end thereof, to a side surface of the cover.

3. A canal type earphone comprising:
a speaker unit;
a housing receiving the speaker unit;
an earpiece installed on an outer surface of a tube which is integrally formed at a front of the housing;
a gasket installed between the speaker unit and the housing; and
a pressure equilibrium means for discharging air within the tube or air within a space between a cover and a vibration plate of the speaker unit to a rear of the speaker unit,
wherein the pressure equilibrium means comprises:
a side air passage through which air within the tube or air within the speaker unit is discharged to a side surface of the gasket or a side surface of the speaker unit; and
a rear air passage through which air in the side surface of the gasket or the side surface of the speaker unit is discharged to the rear of the speaker unit, and
wherein the side air passage is a vent groove which is formed on a front surface plate, the front surface plate being integrally formed at a front end of the housing such that the gasket is pressed against the front surface plate, and the vent groove is connected, at one end thereof, to a through-hole formed at a center of the front surface plate, and is connected, at another end thereof, to an edge of the front surface plate.

4. A canal type earphone comprising:
a speaker unit;
a housing receiving the speaker unit;
an earpiece installed on an outer surface of a tube which is integrally formed at a front of the housing;
a gasket installed between the speaker unit and the housing; and
a pressure equilibrium means for discharging air within the tube or air within a space between a cover and a vibration plate of the speaker unit to a rear of the speaker unit,
wherein the pressure equilibrium means comprises:
a side air passage through which air within the tube or air within the speaker unit is discharged to a side surface of the gasket or a side surface of the speaker unit; and

a rear air passage through which air in the side surface of the gasket or the side surface of the speaker unit is discharged to the rear of the speaker unit, and

wherein the side air passage is a vent hole formed on a cover and a vent groove formed on a back surface of the gasket installed on a front surface of the cover, the vent hole is formed at a position spaced apart from a through-hole formed at a center of the cover by a predetermined distance, and the vent groove is connected, at one end thereof, to the vent hole, and is connected, at another end thereof, to the side surface of the gasket.

5. A canal type earphone comprising:

a speaker unit;

a housing receiving the speaker unit;

an earpiece installed on an outer surface of a tube which is integrally formed at a front of the housing;

a gasket installed between the speaker unit and the housing; and

a pressure equilibrium means for discharging air within the tube or air within a space between a cover and a vibration plate of the speaker unit to a rear of the speaker unit,

wherein the pressure equilibrium means comprises:

a side air passage through which air within the tube or air within the speaker unit is discharged to a side surface of the gasket or a side surface of the speaker unit; and

a rear air passage through which air in the side surface of the gasket or the side surface of the speaker unit is discharged to the rear of the speaker unit, and

wherein the side air passage is a first vent hole formed on the gasket installed on a front surface of a cover, a vent groove formed on a back surface of the gasket, and a second vent hole formed on the cover, the first vent hole is formed at a position spaced apart from a through-hole formed at a center of the gasket by a predetermined distance, the second vent hole is formed at a position spaced apart from a through-hole formed at a center of the cover by a predetermined distance, the first vent hole has a diameter greater than the second vent hole, a damping film is attached to an upper end opened surface of the first vent hole so that the upper end opened surface is closed, and the vent groove is connected, at one end thereof, to the first vent hole, and is connected, at another end thereof, to the second vent hole.

6. A canal type earphone comprising:

a speaker unit;

a housing receiving the speaker unit;

an earpiece installed on an outer surface of a tube which is integrally formed at a front of the housing;

a gasket installed between the speaker unit and the housing; and

a pressure equilibrium means for discharging air within the tube or air within a space between a cover and a vibration plate of the speaker unit to a rear of the speaker unit,

wherein the pressure equilibrium means comprises:

a side air passage through which air within the tube or air within the speaker unit is discharged to a side surface of the gasket or a side surface of the speaker unit; and

a rear air passage through which air in the side surface of the gasket or the side surface of the speaker unit is discharged to the rear of the speaker unit, and

wherein the side air passage comprises a first through-hole formed at a center of a cover and a second through-hole formed on a side surface of a frame constituting the speaker unit, and the second through-hole is formed between the cover and the vibration plate installed within the frame.

7. A canal type earphone comprising:

a speaker unit;

a housing receiving the speaker unit;

an earpiece installed on an outer surface of a tube which is integrally formed at a front of the housing;

a gasket installed between the speaker unit and the housing; and

a pressure equilibrium means for discharging air within the tube or air within a space between a cover and a vibration plate of the speaker unit to a rear of the speaker unit,

wherein the pressure equilibrium means comprises:

a side air passage through which air within the tube or air within the speaker unit is discharged to a side surface of the gasket or a side surface of the speaker unit; and

a rear air passage through which air in the side surface of the gasket or the side surface of the speaker unit is discharged to the rear of the speaker unit, and

wherein the rear air passage is a vent groove formed on an inside surface of a frame constituting the speaker unit.

8. A canal type earphone comprising:

a speaker unit;

a housing receiving the speaker unit;

an earpiece installed on an outer surface of a tube which is integrally formed at a front of the housing;

a gasket installed between the speaker unit and the housing; and

a pressure equilibrium means for discharging air within the tube or air within a space between a cover and a vibration plate of the speaker unit to a rear of the speaker unit,

wherein the pressure equilibrium means comprises:

a side air passage through which air within the tube or air within the speaker unit is discharged to a side surface of the gasket or a side surface of the speaker unit; and

a rear air passage through which air in the side surface of the gasket or the side surface of the speaker unit is discharged to the rear of the speaker unit, and

wherein the rear air passage is a through-hole formed at one side of a cover and a vent groove formed on an inside surface of a frame constituting the speaker unit such that the vent groove is connected to the through-hole.

9. A canal type earphone comprising:

a speaker unit;

a housing receiving the speaker unit;

an earpiece installed on an outer surface of a tube which is integrally formed at a front of the housing;

a gasket installed between the speaker unit and the housing; and

a pressure equilibrium means for discharging air within the tube or air within a space between a cover and a vibration plate of the speaker unit to a rear of the speaker unit,

wherein the pressure equilibrium means comprises:

an inside rear air passage through which air within the tube is discharged between a bracket and a yoke of the speaker unit;

an inside front air passage through which air between the yoke and the bracket is discharged to a front of the speaker unit; and

a rear air passage through which air in the front of the speaker unit is discharged to the rear of the speaker unit.

10. The canal type earphone according to claim **9**, wherein the inside rear air passage is a vent hole formed at one side of a cover and a vent groove formed on an inside surface of a frame constituting the speaker unit, the vent hole is installed at a position spaced apart from a through-hole formed at a center of the cover and a side surface of the gasket by a predetermined distance, and the vent groove is connected, at

an upper end thereof, to the vent hole, and is connected, at a lower end thereof, between the yoke and the bracket.

11. The canal type earphone according to claim **9**, wherein the inside front air passage is a vent groove formed on an inside surface of a frame constituting the speaker unit and a vent hole formed at one side of a cover, the vent hole is installed at a position spaced apart from a through-hole formed at a center of the cover and a side surface of the gasket by a predetermined distance, and the vent groove is connected, at an upper end thereof, to the vent hole, and is connected, at a lower end thereof, between the yoke and the bracket.

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